

An IX White Paper Series Publication

Navigating the New DC Paradigm: Insights, Solutions & Strategies for Plan Sponsors, Trustees and Members

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About the Author

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Key Findings & Recommendations

Key Findings & Recommendations

- The pension industry is transforming with DC gaining market share and becoming more institutional in character
- The retirement planning paradigm is shifting from DB's "we'll do it for you" to DC's "you do it yourself". Consequently, investment risk is being transferred to, and borne by, plan members
- **Member challenges**
 - Ill-prepared for retirement
 - Poorly equipped to make efficient investment decisions
 - Lack practical investment and product knowledge
- **Sponsor/trustee challenges**
 - Plan under-utilization
 - Product offering lacking strategic edge
 - One-size fits all approach to member needs
 - Investment under-performance
- **Recommendations**
 - For sponsors:**
 - Plan enhancement centred on a well-designed fund menu, complemented with analytical tools to enable members to create customized, efficient and well-maintained portfolios
 - A clearly-defined member segmentation and product customization strategy
 - Institutional-grade fund governance practices
 - Member empowerment through investment education
 - For members:**
 - Greater personal responsibility and a more proactive role in retirement planning
 - For regulators:**
 - Deeper understanding of plan members
 - Emphasis on member responsibility & investment education

Executive Summary

Executive Summary

Overview

The pension industry is in a state of evolutionary flux. Fundamental regulatory & demographic changes – as well as new economic & market conditions created by the Credit Crisis – are altering the complexion of the industry and laying the foundation for a new and challenging playing field.

These changes are the harbingers of contrasting fortunes for defined benefit (DB) and defined contribution (DC) plans. For DB, there are strong headwinds, signalling a progressive erosion of market share. DB's loss, however, is DC's gain. As sponsors increasingly question the former as a viable long-term pension vehicle, DC continues to expand and consolidate its industry footprint.

With DC's ascendancy, the retirement planning paradigm is gradually shifting from the cradle-to-grave mind set of “we'll do it for you” to the hands-on, self-directed reality of “you do it yourself”. Accordingly, the burden of responsibility – and investment risk – is shifting slowly but decidedly from employer to employee. This fundamental change is creating unique but interrelated challenges for members, sponsors and regulators alike, each of whom must take appropriate steps to adapt successfully to this evolving environment.

Member Challenges

The average employee – rather whimsically portrayed as “Max” by the European Insurance & Occupational Pensions Authority (EIOPA) – is struggling to adapt to this evolving new world, finding it challenging, if not perplexing. The task he faces demands a high level of financial sophistication, self-reliance and personal responsibility, abilities and traits which he seemingly lacks. Poorly equipped to understand the complex world of investments and the diversity of financial products, inundated with conflicting industry & media messages and confused by choice and information overload, Max is hampered by inertia, procrastination, and

behavioural bias. As a result, he is unable or reluctant to step up to the plate, perpetually postponing to tomorrow decisions which he should make today. His pressing issues are:

Chronic under-saving/inadequate retirement planning & goal setting

Max is alarmingly ill-prepared for retirement. On an Index of Retirement Readiness scale of 0 - 10, Max is more likely to score <6.0, indicating that he is currently doing little or nothing to plan for retirement. To put this in perspective, a score of 6-8 is for employees who have some retirement plans in place and >8 signifies a well prepared employee. At a granular level, 52% of individuals worldwide score <6.0 while only 18% achieve a score >8.0.

If Max is in full-career employment and contributing regularly, when he retires his DC pension will have a 20% shortfall for meeting his income needs, which are estimated to be x11 his final pay. If he does not have a full work history and/or has not contributed to his pension from the beginning of his career, this shortfall is likely to be 48%.

Poor product understanding

Max is prone to misunderstanding his investment options and to making erroneous (and potentially costly) assumptions about what these products actually do. For example, one alarming misconception concerns target date funds: Max does not know that these funds become more conservative the closer he gets to retirement. He is also under the impression that if he invests in them, his account balance is guaranteed and so is his retirement income, both erroneous. Not only are such misconceptions disconcerting for plan members, but they could also have fiduciary and legal ramifications for sponsors.

Irrational or poor investment decision-making

To make matters worse, when Max does act, he makes naïve selections, relies on heuristics, has unstable preferences, and acts irrationally when faced with complexity or uncertainty.

Failing to understand the relationship between risk and return and the role of asset class correlation, Max follows his natural instinct, which is to be risk-averse. Thus, when given the simplistic choice between two funds which have a low correlation, one high-risk and the other low-risk, his tendency is to select the latter, not realizing that a combination of the two funds can yield a higher return for the same level of risk as that of the low-risk fund.

Max also prefers rule-of-thumb decision making and when faced with the choice between a number of disparate (and seemingly complex) funds, he is likely to divide his contribution evenly among them – the so called “1/n rule”. While this is a form of diversification and risk-reduction, it is not efficient as the resulting portfolio does not necessarily “sit” on the efficient frontier.

Max is also prone to behavioural bias and self-doubt. For instance, his perception of risk is strongly influenced by how a fund is “framed” with respect to other funds and not by a rational assessment of relevant quantitative metrics. A fund can therefore be accepted or rejected based purely on the order in which it is presented in relation to other options - in other words, by menu design. Finally, Max is prone to herd mentality, preferring the composition of the portfolio constructed by the median plan member to that of his own!

Inefficient portfolio construction

It is no wonder that Max’s portfolio has an inappropriate asset allocation, an unsuitably high exposure to equities and, above all, is inefficiently constructed. The resulting “performance sacrifice” from not being positioned on the efficient frontier “costs” Max between 0.15% to 0.38% per annum and, at the extreme, as much as 1.0%. If Max is 25 years old, his performance sacrifice is approximately 0.28% per annum. Assuming he retires at 70 and is currently contributing €5,000 per annum to his pension, his cumulative portfolio underperformance by the time he retires could be as much as €234,000.

There are two reasons for this large shortfall: First, foregone returns that are otherwise “up-for-grabs” in an efficient portfolio; second, the compounding effect of these returns. If we consider fund underperformance as a third inefficiency factor, then the combined effect is even more pronounced.

Effectively, if Max holds an inefficient portfolio over the entire length of his working career and the funds he uses are of poor quality, he is punished thrice.

Sponsor Challenges

At the other end of the spectrum, anecdotal and research evidence suggest that sponsors who already offer a DC plan are struggling with a wide range of challenges of their own. Likewise, those who are switching (or have switched) from DB to DC are echoing similar adaptive issues. These are as follows:

Plan under-utilization

For sponsors, achieving high member plan participation is a key measure of success. Paradoxically, it is also one of their main challenges, suggesting that they are failing to achieve this goal. In the UK, for instance, approximately 1/3 of DC plans have membership levels below 50% of those eligible to join. While this underutilization is to a degree understandable - plan participation being largely voluntary - it spotlights another driver: Member dissatisfaction. Only 50% of employees are satisfied or very satisfied with their plan while, more disconcertingly for sponsors, 25% are dissatisfied or very dissatisfied. Therefore, many members do not participate in (or fully engage with) their DC plans – much to the dismay of sponsors.

These sentiments appear to be in sharp contrast to the view held by 83% of the sponsors who believe that their plan is “*valued by employees*” - their most important success factor. Clearly, sponsors must address this disconnect between their perception and the reality in the trenches by re-evaluating and upgrading their value proposition to their members’ satisfaction.

Inefficient fund menu design and content

More often than not, DC fund menus are inefficiently designed. Among the symptoms are: The “framing effect”; too many or too few funds; and fund under-performance.

A congested menu creates choice and information overload, leading to member disengagement. Conversely, too few funds sacrifices on range, breadth and balance. While there is no hard and fast rule as to what constitutes an “optimum” number, studies have homed in on a range of 13-32. In this range predicted investor participation rate remains around 70%, but drops off sharply when funds exceed ~32.

Zeroing in on an optimal number of funds is only the beginning of the process for creating a well-designed fund menu. The type and proportion of funds offered also strongly influence the nature of the portfolios members eventually build. This framing effect is a common problem with DC menus and leads to curiously odd reactions from plan users. For example, increasing the proportion of equity funds relative to bond funds leads to a greater allocation to equities whereas simply increasing the number of funds causes participants to shy away from equities in favour of safer bond or money market funds.

The framing effect is amplified when members apply heuristics to fund selection and portfolio construction. In such cases, it is effectively the menu design rather than the investor’s utility preferences that forges the asset allocation and portfolio construction path. The resulting portfolios are just a shadow of the fund menu with the member’s heuristics overlaid on it. Thus a menu dominated by equity funds will result in a portfolio dominated by equities, regardless of the member’s risk profile and investment needs. Similarly, a bond-dominated menu will result in a portfolio containing an unsuitably high percentage of bonds.

Investment underperformance/ Lax fund governance

DC plan assets underperform their professionally-managed DB counterparts by approximately 1%, based on asset-weighted median returns.

There are two main reasons: Higher costs and poor fund performance. DB schemes often pay lower, institutional management fees. This factor alone can accounts for at least a quarter of the weighted performance differential. Moreover, large DB schemes are able to get further preferential rates, which account for their above-average performance versus smaller DB schemes. Trustee fees are also crucial as they typically range from 0.5% to 1.0% per annum of the plan assets, a substantial spread which favours only the larger plans. Equally

importantly, DB plans approach their fund selection with greater diligence and care, not only finding better managers but also monitoring their performance with greater scrutiny.

Insights, Strategies & Solutions

The less-than-ideal picture that emerges is of plan members who are ill-prepared for retirement and sponsors who are struggling with disparate internal challenges. These member and sponsor challenges are not stand-alone issues but are complex and inter-related. Solutions must therefore be coordinated, multi-lateral and multi-disciplinary, fully centred on plan members and their needs. The key stakeholders must each assume their respective responsibilities to ensure that the solutions provided and pursued are effective and long-term.

For sponsors, we propose a three-pronged approach to resolving these issues:

- Plan enhancement and efficiency centred on a well-designed fund menu complemented with sophisticated tools, enabling members to create customized, efficient and well-maintained portfolios for their retirement
- A clearly-defined member segmentation and product customization strategy
- Empowerment of members through investment education and training, encouraging them to engage proactively with their plan and take charge of their retirement planning

The lack of member investment knowledge is the undercurrent of most of the challenges facing sponsors in their goal of encouraging employees to engage with their plan and better prepare for retirement. Employees themselves are also pointing to this gap with 18% saying that financial education would encourage them to save for retirement. This is compelling evidence that investment education is not a luxury, but a need. On this point, we recommend dialogue and collaboration with policy-makers as a catalyst for providing access to effective educational tools and resources that can improve member investment understanding and decision making.

Implementing these improvements constitutes a timely and prudent marketing exercise for sponsors at a time when DC participants are increasingly calling for more than just the typical bare-bone features in a plan.

Plan Enhancement & Efficiency: Creating the Ideal Platform

Sponsors should closely re-evaluate their product offering and take steps to enhance their overall value proposition by providing an institutional-grade platform. In conjunction, they should distance themselves from the “one size fits all” approach and accept that members are not a homogenous group despite EOPIA’s rather crude characterization of Max as a “typical” plan member.

Not only do members differ in their investment needs but also in their attitudes toward investing and their level of investment knowledge. At one end of the scale is the “do-it-for-me” majority, content to defer investment decisions to a third party. This group generally lacks investing skill and is understandably unenthusiastic about getting involved in what it perceives to be a complex or obtuse subject matter. In sharp contrast is the “I’ll-do-it-myself” contingent. Members of this group are proactive, independent-minded investors who prefer to be firmly in the driving seat of the decision-making process. Consequently, they stand to benefit most from an open architecture, value-added platform that gives them a free hand in engineering their retirement. This “silent minority” is by no means insignificant as it accounts for 38% of the membership universe. Confining such individuals to restrictive menu options only serves to disengage them, contributing to plan underutilization.

An optimal platform is designed to cater sufficiently to both sets of attitudes, striking a commercially viable balance between standardization and customization. The answer lies in differentiation through member segmentation and platform diversification. The result is standardization for one group and customization for the other - default funds for those who require implemented solutions and a wider choice of core as well as risk-profiled funds and supporting resources for the remainder.

Conceptually, this platform is centred on a well-designed menu of best-of-the-breed funds distinguished by five attributes: **Quality, quantity, range, breadth, and balance**. When each of these is at its optimal level, the combined affect is

improvement in the overall effectiveness of the menu, transforming it from a mere collection of funds into a powerful investment tool. Equally important is how an optimal fund menu contributes to better investment returns by improving the quality of funds on offer.

A second component is a range of sophisticated tools including a risk profiler, modeller, portfolio builder and re-balancer. These, coupled with a range of quality funds, will enable members to construct a portfolio which is **customized, efficient and well-maintained**: We refer to this as the **C-E-W principle**.

Finally, this platform is equipped with a suite of dynamic educational resources to empower members to take charge of their retirement future. This is a refreshing departure from the traditional “vanilla” investment education provided by sponsors “telling” Max what to do; instead the focus is on “reforming” Max into an **informed, empowered investor** able to take full charge of setting and executing his retirement mandate and objectives. In short, good education should be the foundation of good investing.

Adopting this approach not only makes good governance sense, but is also a sensible and strategic brand-enhancing exercise to deliver a quality investment platform with tangible member appeal. These enhancements will create the framework for an interactive and sustainable employee/sponsor engagement, empowering plan members to proactively participate in designing and implementing a viable retirement plan through the optimal use of the resources provided to them by the sponsor.

Fund Governance

The practice of governance is a **holistic process** encompassing all aspects of the relationship between sponsor and member. At an elementary level, it spells out the broad responsibilities of each party. At a granular level, it defines the parameters of the duties that fall within the immediate remit of the sponsor. These include: Selecting quality funds; monitoring the performance of these funds at reasonable intervals; making provisions for on-going member communications; providing educational resources and technical tools; and selecting and monitoring trustees.

The codification of these responsibilities and duties into formal policy documents and guidelines is the essence of good governance. One such document is the **Investment Policy Statement (IPS)**, an over-arching instrument which enumerates both trustee and member roles & responsibilities. Yet many sponsors evidently do not have such a formal document in place.

A telling aspect of the IPS is that the sponsor is not responsible for establishing investment parameters for individual members. Given that DC plans are “self-directed”, members are ultimately responsible for all investment-related decisions and actions. Implicitly, therefore, they are obliged to acquire (or already have) sufficient investment knowledge and know-how to be able to make these critical decisions, provided the sponsor furnishes an adequate educational and technical framework for this purpose.

To achieve the goal of providing a well-designed funds menu, sponsors should focus on improving their fund governance, adopting more robust, institutional grade practices for manager selection, monitoring & review. Two sub-sets of the IPS document deal specifically with this issue: The **Due Diligence Policy (DDP)** and the **Manager Continuation Policy (MCP)**. DDP should establish a framework for evaluating a fund management company, particularly the fund manager and his team. This top-down analysis typically consists of a pyramid of six steps, the “6Ps”:

- Physical: The organizational foundation of the fund company
- People: The fund management team
- Philosophy: The fund manager’s investment mandate
- Procedure: Operational risk and investment process risk
- Performance: Return measurement, appraisal and attribution
- Price: Fund fees and management charges

MCP, on the other hand, should provide guidelines for the on-going monitoring and review of managers once they have been selected. The ultimate aim is to replace those fund managers who do not add value and retain those that do but in such a way as to minimize turnover, and therefore cost. Sponsors should ensure that this decision is made within an appropriate **statistical framework**, such as the

null hypothesis test, so that Type I (retaining unskilled managers) and Type II (dismissing skilled managers) errors are minimized or avoided.

In both DDP and MCP, appropriate risk-adjusted return measures (RAPM) should be employed, depending on the type of fund under review. These include, but are not limited to, the Sharpe Ratio, Information Ratio, Treynor Ratio, Alpha and Jensen's Alpha. Information Ratio is a particularly useful **diagnostic tool** for assessing manager skill as it could be predictive of performance.

Conclusions & Recommendations

The DC industry is transforming and becoming more institutional in character with implications for all stakeholders for whom we offer the following recommendations:

Plan Members

Plan members must take personal responsibility in accepting a proactive role in their retirement planning. This means acknowledging that the baton has effectively been passed on to them by their patrons who have shifted down a gear from the “we will do it for you” modus operandi of yesteryear to a “you do it yourself” paradigm of today. Now there is a more pressing need for members to be “know-how” self-sufficient, conversant with – if not competent in – the basic principles of investing. This is especially timely now because the cost of obtaining impartial investment advice is likely to be prohibitive for many plan members, both before and after retirement.

Plan Sponsors

For sponsors, this evolution underlines the dual need for upscaling their value proposition with more customized features and stricter fund governance to ensure that only best-of-the-breed, added-value funds are provided to members, who are increasingly demanding more than just the bare bones from their plan.

Equally, it is time for sponsors to accept that their members are as much “clients” as employees and begin to view their DC plan as a commercial and marketing

vehicle - in other words, as a “product”. At many levels, this product is wanting: Poorly-designed, sub-par in content, standardized and uninspiring, it distances plan members rather than inspires them to engage with the task of retirement planning. To redress these critical shortfalls, sponsors should strive to introduce dynamic, customizable solutions while at the same time segmenting their clients, acknowledging **that one-size does not fit all**. At the core of these solutions are a well-designed menu of quality funds, a wide range of tools for risk profiling, portfolio building, re-balancing and modelling, as well as customizable educational resources delivered through regular seminars, workshops and meetings. These facilities should enable participants to design fit-for-purpose portfolios which are **customized, efficient and well-maintained**.

In addition, sponsors should upscale their fund governance, employing institutional-grade practices which are encoded in formal and up-to-date Manager Due Diligence and Manager Continuation Policies. These practices will guide sponsors in selecting and retaining only those fund managers who demonstrate quantifiable investment skill. If this critical function is farmed out to trustees or outside investment consultants, then it is imperative that sponsors satisfy themselves that the relationship is not compromised by any conflict of interest. More often than not, however, the investment consultant is also the fund company as well in which case the impartiality of the fund selection is at best dubious, especially if the entire range, or at least a significant portion thereof, is also provided by that fund house. For fiduciary and practical reasons, sponsors must place the complete **independence** of the fund selection process at the core of their governance practices.

Regulators

Regulators have an important role to play in defining the overall responsibilities of each of the stakeholders and for placing necessary emphasis when, where and how it is most required. However, they have at times shown themselves to be out of synch with the rapidity of the transformations which are driving the DC industry. At other times they have tended to be myopic, focusing their attentions unevenly on the sponsors and trustees as if they were still the paternal guardians of plan members. This focus must shift to the members, placing a greater burden of responsibility on their shoulders for their own welfare.

New initiatives should echo and re-enforce research findings that DC plan members are deeply under-nourished when it comes to investment education. While we do not propose mandatory education for members along the lines already required of trustees, we do recommend that regulators at least mandate the provision of **formal investment education** by sponsors. This effort should strive not to just educate but to empower plan members in becoming well-informed, self-reliant investors capable of complex decision-making and of taking active control of their future financial welfare.

In addition, regulators must engage with plan members closely enough to gain a realistic understanding of their needs and requirements before proposing mandates or initiatives that do not necessarily reflect reality. For instance, to portray the average plan member as the whimsical “Max” clearly misses the point: Far from being homogenous, plan members represent a diverse and eclectic cross section of society with different needs and aspirations. Regulators should therefore place themselves in the driving seat of reform and instil a greater sense of urgency for retirement planning, but always keep in mind the tenet that the course and direction of the journey must be set by the passengers - the plan members – and the dynamic realities brought about by the dictates of change.

1. Introduction

1. Introduction: An Industry In Transition

The global pension industry represented by sixteen of the larger national markets has been growing at a compound rate of 6% over the past decade and now holds \$36tn in assets¹. Of these, \$33.8tn, or 93.5%, is owned by seven economies: The US, UK, Japan, Australia, Canada, the Netherlands and Switzerland.

Due to demographic, regulatory, economic and stock-market related factors, DB's share of this "P7" market has been shrinking steadily, from 61.0% in 2004 to an estimated 53.3%, or \$18tn, in 2014. The beneficiary has been the DC segment which has been growing at a compound rate of 8.1%² per annum for the past decade – compared to DB's 4.7% – and now boasts \$15.8tn in assets.

These developments are the harbingers of contrasting fortunes for DB and DC. For DB, there are strong headwinds, signalling a progressive loss of market share in favour of DC as sponsors increasingly question the former as a viable, long-term pension vehicle. This DC expansion is assisted by the gradual phasing out or outright closure of some existing DB plans as employers no longer offer the facility to new staff. The changing of the guard is illustrated by the fact that today none of FTSE 100 companies offer a DB pension to their new employees³ – Royal Dutch Shell became the last company to join these ranks in 2013. Even among Fortune 100 companies, only 30 offer DB plans to their newly hired⁴.

The industry has clearly crossed a Rubicon in that this gradual migration from DB to DC is manifestly a long-term structural shift rather than a temporal change. Many institutions have already begun the process of switching their plan, only to discover that employees are less than prepared for this new paradigm. The gulf between DB's cradle-to-grave "we'll do it for you" mind set and DC's hands-on, self-directed "you do it yourself" approach is indeed vast and recent studies show that the transition from one to the other is far from smooth. For employees, the main issues are largely behavioural and knowledge-based, resulting in a palpable lack of retirement readiness. These are:

1. Chronic under-saving/inadequate retirement planning & goal setting
2. Poor product understanding
3. Irrational or poor investment decision-making

4. Inefficient portfolio construction
5. Plan under-participation

At the other end of the spectrum, DC sponsors and trustees⁵ are faced with their own specific challenges relating to plan design and content, member engagement, effective communication, governance and investment returns, summarized below:

1. Plan under-utilization
2. Inefficient fund menu design and content
3. Investment underperformance
4. Lax fund governance

The lack of retirement readiness is of concern not only to plan members and sponsors but also to governments whose resources for providing future social benefits are increasingly under pressure. To address these challenges effectively requires multi-lateral action: Plan sponsors must evaluate their product offering and take steps to enhance their value proposition by moving away from a “one size fits all” approach to adopting instead a member segmentation and product customization strategy, including targeted communication with plan members and better provisions for their financial literacy. Implementing these improvements would constitute a timely and prudent marketing exercise for sponsors at a time when DC participants are increasingly calling for more than just the typical bare-bone features in a plan. Individuals, for their part, should consider (and be actively encouraged in) taking greater personal responsibility for their retirement through investment education and awareness. In combination, these modifications will serve as a framework for a sustainable and interactive employee/sponsor engagement, the stepping stone for empowering plan members to proactively participate in designing and implementing a viable, long-term retirement program through the optimal use of sponsor-provided resources. Finally, regulators should step up to the plate and work closely with sponsors to inspire and motivate employee along the path to retirement readiness.

In this paper, we examine these challenges from the dual perspective of sponsor and plan member and while for convenience we present our discussion under two separate headings, we note that they are intricately interrelated. To elaborate, we use examples from current academic research and industry surveys, blending

them with our in-depth analysis to provide practical insights and solutions for sponsors, members and regulators.

For sponsors, we propose a three-pronged approach to resolving these issues:

- Plan enhancement and efficiency centred on a well-designed fund menu complemented with sophisticated tools to enable members to create **customized, efficient and well-maintained portfolios** for their retirement
- A **member segmentation** and **product customization** strategy
- Member **empowerment through investment education**, encouraging them to engage proactively with their plan and take charge of their retirement planning

On the issue of education we explore the regulatory bias toward trustee training and education and pose this rhetorical question: “When it comes to investment education and training, why is there so much emphasis on plan trustees and not on its members?” It seems odd that the ultimate beneficiary of a sponsor pension plan should not share the “burden” of responsibility for investment self-education. We conclude that equal emphasis should be placed on employee education with a view to creating a workforce which is fully aware of its retirement-planning responsibilities. Such a well-informed cohort is most likely to engage effectively with – and better utilize – the plan resources made available by sponsors.

2. DC Member Challenges

2. DC Member Challenges

The range of member behaviours described in the introduction is at odds with the central principle of the Rational Choice Theory (RCT), namely that investors make optimal wealth-enhancing decisions based on their personal utility preferences. An investor acting according to RCT will consider the trade-off between risk and return, assess personal risk tolerance and capacity, factor in investment time horizon and the impact of time value of money and thus begin investing at the earliest possible point in time by constructing an optimal retirement portfolio. This, of course, assumes that he has the know-how as well as the resources needed to do so, an assumption which is not always valid as either one or the other (or both) is lacking in a typical DC plan.

Meet Max! is an initiative⁶ by the European Insurance & Occupational Pensions Authority (EIOPA) which aims to shed light on how individuals actually process information and make financial decisions, and proposes ways of presenting this information that could make it more user-friendly. The typical DC plan member is portrayed as a rather unflattering character called Max who:

- Has limited time and motivation to plan his retirement
- Finds excessive choice confusing
- Makes suboptimal decisions when faced with uncertainty and complexity
- Uses rules of thumb to reduce complexity
- Has a preference for certainty (i.e., is risk averse)
- Compares himself to others
- Looks for reference points
- Looks for information he recognizes
- Is short-term oriented and lacks will power
- Is concerned about his future pension income
- Wonders what he can do to improve his pension situation
- Is struggling with the above question, which worries him

The explanation as to why theory and practice diverge so widely for Max is provided by behavioural economics which identifies a number of factors that compromise prudent and rational investment decision-making, namely: Procrastination; inertia; naïve and heuristic decision making; unstable preferences;

and extremeness aversion. Compounding these factors is a palpable lack of investment knowledge and understanding.

2.1. Under-saving/Inadequate Retirement Planning & Goal Setting

Max is not saving and investing enough to meet his retirement needs. This is the message emerging from many studies on the state of global retirement readiness. A US study⁷ found that those individuals who are in “full-career” employment (expected to work for ≥30 years) and contributing regularly to their DC pension will have, on average, a **20% shortfall** in private (i.e., not including social benefits) financial resources required to meet their retirement income needs. This figure is derived from the projection that an average employee’s financial needs during retirement will be approximately x11 final pay with an average shortfall of x2.2 ($2.2/11.0 = 20\%$). More broadly, only 29% of employees in the full-career category are expected to meet or exceed these resource levels while almost a third will have a shortfall in excess of 54%.

These projections are more striking for those who either do not have a full work history (“mid-career hires”) and/or have not contributed to their pension from the beginning of their career. For employees

in this category, the **average** shortfall is projected to be 48%. When the two categories are combined to make up the universe of all employees in the study, only 15% are projected to be sufficiently resourced.

Table 1: Retirement Readiness Index Scores	
Score Band	Interpretation
<6	Not prepared
6-8	Somewhat prepared
>8	Well-prepared

The affirmation is provided by an Index of Retirement Readiness (IRR). According to one index provider⁸, the global IRR score stands at 5.9 on a scale of 0 - 10, where 10 represents full preparedness (Table 1). A score of <6.0 indicates that “individuals are currently doing little or nothing to plan for retirement”; 6-8 that “individuals have some retirement plans” in place; and >8 signifies a “well prepared” employee.

At a granular level, 52% of individuals worldwide score <6.0 while only 18% achieve a score >8.0. As we might intuitively expect, habitual savers are more likely to fall in the >8.0 score band (36%) while non-savers are more likely to fall in the <6.0

band (83%). However, the data suggest that being a habitual saver does not necessarily assure retirement preparedness as 64% of habitual savers score <8.0, implying that monies saved are not invested in the most efficient manner. We will explore this issue closely in Section 2.4.

The poor global IRR score is well reflected across most developed countries with only a few nations standing out as “somewhat prepared”: India = 7.0; USA & China = 6.5; and Germany = 6.1. Other nations are generally either borderline or fall in the “not prepared” category: UK & Canada = 6.0; The Netherlands & Australia = 5.8; France = 5.4; Spain = 5.1; and Japan = 4.8. While no specific figures are provided for Ireland, other surveys indicate that retirement readiness is “poor” (see Appendix V for an overview of this market). These scores are a good gage of the current investor complacency and are an implicit call for collaborative and corrective action at all levels to address the social burden and threat of financial shortfall at retirement.

2.2. Inadequate Product Understanding

Research from the US and UK⁹ corroborates an oft-expressed lament by sponsors that Max generally lacks practical investment knowledge & understanding. This concern was highlighted in one industry surveys¹⁰ in which sponsors named “*insufficient member [investment] understanding*” as their second most challenging issue in a list of twelve. In the same vein, another survey¹¹ asked sponsors to rank what they view as critical success measures for their plan: “*Participant understanding of investment options*” was ranked second by 43% of respondents, echoing another finding that “*60% of plan participants don’t understand their investment options*”.

With the wide array of investment products available to plan members as well as the inherent complexity of the subject matter, these considerations are understandable and warranted. For example, the last survey revealed some startling member misconceptions about target date funds: 33% of respondents either did not think or did not know that “*target date funds become more conservative the closer members get to retirement*”; 34% thought that if they invest in target date funds, their “*account balance is guaranteed*”; and 37% were under the impression that these funds “*guarantee retirement income*”.

Table 2: Actual Equity Allocations in Default Funds			
Fund Choice (Model Portfolios & Core)	Allocations According to Member Profile		
	Conservative	Moderate	Aggressive
Conservative (%)	31	1	0
Moderate (%)	3	42	4
Aggressive (%)	0	2	42
Core (%)	66	55	54
Total Equity Exposure (%)	77	80	89

Members seem to be equally perplexed when using default funds. In a US study¹² of an actual plan which offered three lifestyle funds (conservative, moderate and aggressive) and six diversified core funds, members who viewed themselves as conservative or moderate in terms of risk outlook ended up with very similar (and inappropriately high) allocations to equities, as illustrated in Table 2. “Conservative” members allocated 31% of their contributions to the Conservative Fund, 3% to the Moderate Fund and none to the Aggressive Fund with the balance going into a variety of core funds. The net effect was an equity exposure of 77%, clearly excessive for a “conservative” investor for whom the rule of thumb for equities is ~20%. Similarly, the “moderate” members ended up with a total equity exposure of 80%, almost the same as the “conservative” members! For calibration purposes, the rule of thumb allocation to equities for a “moderate” investor is 40%-60%, depending on age.

2.3. Procrastination & Inertia

Two common reasons for Max avoiding participation in his retirement plan are procrastination (the desire to maintain the status quo) and inertia (deferring the day of reckoning for complex investment decisions). Either way, the outcome is detrimental. For instance, if he has not yet stepped on to the retirement saving and investing ladder, the consequence is valuable time lost for compounded returns and accumulated wealth. If he has, but remains passive, the cost is inappropriate asset allocation due to failure to rebalance his portfolio.

2.4. Irrational or Poor Investment Decision-making

Closely aligned with poor product understanding is insufficient knowledge of investment first principles which invariably spills over into the critical decision-making phase of retirement planning. The end-result is often an inefficient portfolio.

2.4.1. Inefficient Portfolio Construction

An area of concern for plan sponsors is member inability to make “*portfolio allocations according to age and/or risk preferences*”¹¹ or to construct efficient portfolios. A recent study¹³ found a considerable return shortfall due to portfolio inefficiency. The resulting “performance sacrifice” varied across age groups ranging from 0.15% to 0.38% p.a.; at the extreme, the figure was as high as 1.00%. For the under-30 age cohort, for instance, the average shortfall was 0.28% p.a.

Such shortfalls have serious implications, especially for those members who are at the beginning of their working career. There are two obvious reasons: First, foregone returns that are otherwise “up-for-grabs” in an efficient

So what’s the big deal with inefficiency?

Member current age:	25
Years to retirement:	45
Annual underperformance:	0.275%
Annual contribution to pension plan:	€5,000

Cumulative underperformance at retirement:

€234,165

portfolio; second, the compounding effect of these returns over the investment horizon. If we consider benchmark under-performance as a third inefficiency factor, then the combined effect is even more pronounced and the resultant financial loss potentially irreplaceable. Effectively, those holding inefficient portfolios over the entire length of their working career are punished thrice if the funds they use also perform poorly.

To illustrate the impact of the first two factors, suppose a 25 year old Max currently investing €5,000 annually in his pension and expecting to retire at 70. The average annual performance sacrifice for his cohorts is ~0.28%. At this rate, his compounded under-performance at retirement due to a sub-optimal portfolio could be in excess of €234,000¹⁴. As noted, the average expected financial resources needed at retirement is x11 final pay for a “full-career” employee, while the average shortfall is x2.2 this amount, or 20%. If we assume Max’s final pay to be €60,000/annum, his shortfall due to portfolio inefficiency could be the difference between a comfortable retirement (surplus of x1.9, calculated as €234,000/€60,000 = 3.9 - 2.2 = 1.9) and a not-so-comfortable one (deficit of x2.2). The encouraging corollary is that a simple re-engineering of Max’s inefficient

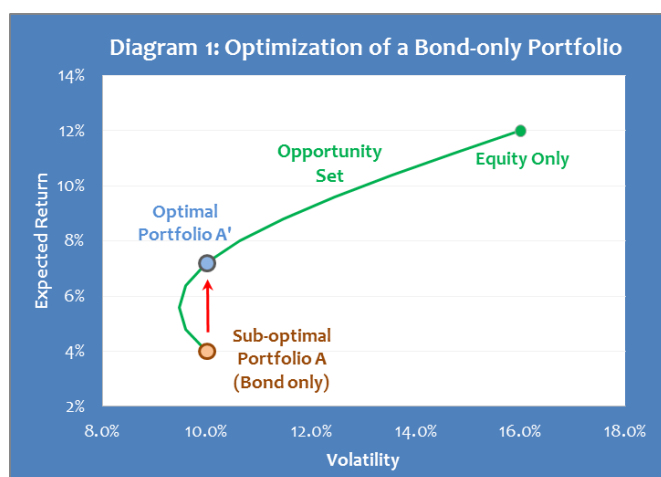
portfolio can go a long way toward correcting some, if not all, of this potential shortfall.

There are three common causes for this inefficiency: Naïve selections, unstable preferences and heuristic decision making. The thread running through these factors is invariably a lack of investment knowledge.

2.4.2. Naïve Selections

We consider a simplistic example of a plan offering its members only two choices: A Low-risk bond fund and a high-risk equity fund with risk/return characteristics as outlined in Table 3. Diagram 1 traces the opportunity set of these two funds. For Max, who is by nature risk-averse, the uninformed decision would be to invest 100% of his contributions in the less-risky bond fund. However, this portfolio, designated A, is **sub-optimal** since

Table 3: Fund Risk and Return Profile		
Funds & Risk-free	E_r (%)	σ (%)
Bond	4.0	10.0
Equity	12.0	16.0
Risk-free	1.0	0.0
Equity/bond correlation = 0.3		



the opportunity set of the two funds includes a unique portfolio which, **for the same level of risk, will provide a much higher return**. This is **optimal portfolio A'**. The red arrow marks the direction of optimization from A to A'. The bond and equity weights in portfolio A' are 60% and 40%, respectively. Thus, by adding “risky” equities to

Portfolio A, Max has actually **increased** his portfolio’s expected return by 3.2% and more than doubled its risk-adjusted return, as measured by the Sharpe ratio, without changing its level of risk (Table 4). To Max, increasing the weight of equities in the portfolio at no additional increment of risk may seem counter-intuitive at first, but this is the direct result of the low correlation between these funds. The opportunity set line demonstrates this concept graphically: As we introduce the riskier equity fund into

Table 4: Optimal & Sub-optimal Portfolio Profiles					
Portfolio	E_r (%)	σ (%)	Bond wt (%)	Equity wt (%)	Sharpe
A (Sub-optimal)	4.0	10.0	100.0	0.0	0.30
A' (Optimal)	7.2	10.0	60.0	40.0	0.62
Net change	3.2	0.0	-40.0	40.0	0.32

the mix (moving from Portfolio A left along the opportunity set line), the overall portfolio risk **falls** until we pass the inflection point. This is a crucial point about the mechanics of diversification and portfolio optimization and although we have used a simplistic two-fund example, the principle is universal: Diversification reduces risk while optimization increases returns for a given level of risk.

2.4.3. Unstable Preferences

The role of behavioural bias in consumer choice is well documented in marketing literature. In an investment context, the phenomenon is an impediment to rational decision-making. One such behavioural peculiarity is “extremeness aversion”, the tendency to avoid the point at the extremity of an arbitrary continuum.

To demonstrate, one experiment¹⁵ presented investors with three scenarios based on different arrangements of four funds, labelled A, B, C & D - risk increasing in that order. Fund C was designated as “control” in each scenario (Table 5).

In scenario 1, where C was framed as the riskiest fund in the set A, B, C, only 29% of participants selected it. When it was framed as the “mid-risk” fund in scenario 2 using the set B, C, D, almost 54% of the participants selected it. Finally, when it was framed as “neutral” in scenario 3 using the set B & C only, 39% of respondents selected it. Fund C’s risk profile was identical in each scenario and yet participants viewed it quite differently based solely on how it was presented in relation to other options.

Table 5: Extremeness Aversion						
Framing Order					Investment C framed as:	% of Participants Selecting C
Scenario	Increasing risk >					
1	A	B	C		Extreme risk choice	29.2%
2		B	C	D	Middle risk choice	53.8%
3		B	C		Neutral	39.0%

This preference inconsistency and irrational bias has also been demonstrated in plan participants’ behaviour with regard to their own actual selections. Exploring this idea further, the above experiment revealed the curious observation that participants preferred their plan’s median portfolio composition to their own!

2.4.4. Reliance on Heuristics

When faced with complex decisions, Max's natural reaction is to procrastinate or postpone. Resorting to heuristics - convenient short-cut "solutions" and rules of thumb - is perhaps a subtle way of appeasing his undecided mind.

Table 6: Capital Market Expectation & Correlations								
Fund	E_r (%)	σ (%)	Correlation Matrix					
			1	2	3	4	5	6
1	14.0	28.1	1.00					
2	11.0	20.9	0.87	1.00				
3	4.8	11.4	0.60	0.71	1.00			
4	7.0	9.2	0.40	0.45	0.31	1.00		
5	4.9	7.2	0.88	0.85	0.54	0.53	1.00	
6	3.5	18.1	0.62	0.60	0.57	0.52	0.66	1.00
R_f	2.1	0.0						

One such heuristic is the $1/n$ "rule" which divides assets equally among n available options. To illustrate, we consider a plan offering a suit of six funds whose capital market expectations and correlation matrix are shown in Table 6. Max invests $1/6$ th (16.7%) of his contributions in

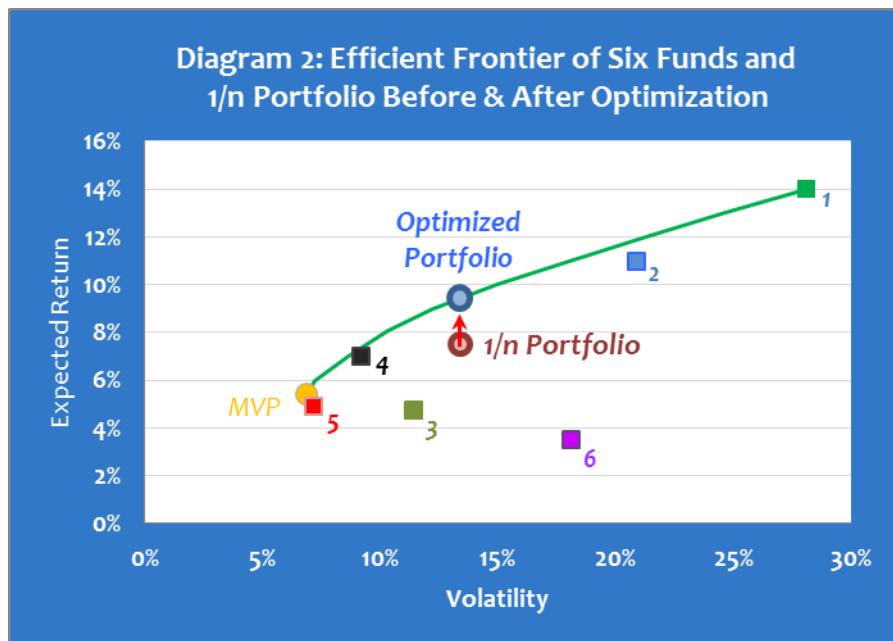
each of the funds, creating a portfolio with an expected return of 7.5% and volatility of 13.4% (Table 7). Diagram 2 is a plot of the efficient frontier of the six funds and their respective positions on it. Also marked is the $1/n$ portfolio, which lies significantly **below** the efficient frontier. In contrast, the new optimized portfolio sits on the efficient frontier and, **for the same level of risk as the $1/n$ portfolio**, provides a superior expected return of 9.44%, an improvement of 1.91%. As to be expected, this new portfolio is also superior to its predecessor on a risk-adjusted basis with a Sharpe ratio of 0.63, up from 0.49. This optimization has been achieved by re-allocating to funds 1, 2 and 4 in the proportions shown in Table 8.

Table 7: $1/n$ Portfolio and New Optimized Portfolio			
Portfolio	E_r (%)	σ (%)	Sharpe
$1/n$ (Sub-optimal)	7.53	13.38	0.49
New (Optimal)	9.44	13.38	0.63
Change	1.91	0.00	0.14

Table 8: $1/n$ Portfolio Pre and Post Optimization Fund Weights						
Portfolio	Wt 1 (%)	Wt 2 (%)	Wt 3 (%)	Wt 4 (%)	Wt 5 (%)	Wt 6 (%)
$1/n$ (Sub-optimal)	16.67	16.67	16.67	16.67	16.67	16.67
New (Optimal)	34.72	0.32	0.00	64.97	0.00	0.00
Change	18.05	-16.35	-16.67	48.3	-16.67	-16.67

This up-for-grabs "extra" return would have been lost had Max relied solely on heuristic wisdom. The

gain is even more impressive when we factor in compounding: For a 20-year investment horizon, for instance, it equates to almost 46% $[(1.0191^{20} - 1) \times 100]$. Applying the rule of 72, the initial investment will theoretically double in approximately 38 (72/1.91) years due solely to this optimization.



3. DC Sponsor Challenges

3. DC Sponsor Challenges

Sponsors offer DC plans not only for competitive reasons but also because they have a genuine interest in the retirement future of their employees. It is therefore doubly important for them to ensure that what they offer is fit for purpose and helps members plan effectively for their retirement.

3.1. Plan under-utilization

Sponsors responding to a US survey¹ chose “*having employees feel confident about prospects for a comfortable retirement*” as the top criterion for measuring plan success. Therefore, it is not surprising when they also state that achieving high member participation is a key measure of plan success. In a UK survey¹⁰ “*high participation rates*” was ranked fourth in the hierarchy of ten similar sponsor-defined factors. Paradoxically, this survey also revealed “*increasing employee participation*” as one of twelve current challenges facing sponsors, suggesting that they are not achieving this objective satisfactorily.

This contraction was corroborated by member attitudes toward their plan, notably that “*around a third of DC plans have membership levels below 50% of those eligible to join*”, suggestive of a vote of poor confidence. While this underutilization is to a degree understandable – plan participation is largely voluntary and many members are prone to procrastination and inertia – the survey spotlights another driver: Member dissatisfaction. Only 50% of employees said that they were “*satisfied or very satisfied*” with their plan while, more disconcertingly for sponsors, 25% were “*dissatisfied or very dissatisfied*”. Therefore, either by default or by choice many members do not participate in (or fully engage with) their DC plans – much to the dismay of sponsors. These responses appear to be in sharp contrast to the view held by 83% of the sponsors who believe that their plan is “*valued by employees*” – their most important success factor. Clearly, sponsors should address this disconnect between their perception and the reality in the trenches by re-evaluating their value proposition and upscaling it to their members’ satisfaction.

3.2. Inefficient Fund Menu Design & Content

Fund menu inefficiency can be quantified in terms of five basic aspects of design: Quality, quantity, range, breadth, and balance. The adverse effect on investment outcome can be exaggerated when poor design is combined with behavioural bias, as manifested by the combination of the framing effect and heuristic decision-making.

3.2.1. The Agony of Choice

A congested menu creates **choice and information overload** and leads to investor disengagement. Conversely, too few funds sacrifices on range, breadth and balance. Most DC plans offer between 15-37 funds with a median of 24¹⁶. While there is no hard and fast rule as to what constitutes an “optimum” number of funds, one study¹⁷ suggests a range of 13-32. “Predicted investor participation rate” remains around 70% in this range but drops off sharply when the number of funds exceeds ~32. The study also concludes that for “every 10 funds added to the choice menu the average employee’s participation probability is lowered by about 2%”.

3.2.2. The Framing Effect

Zeroing in on an optimal number of funds is only the beginning of the process for creating a well-designed fund menu. The type and proportion of funds offered also strongly influence the nature of the portfolios members eventually build. This “framing effect” is a common problem and leads to curiously odd reactions from plan users. For example, increasing the proportion of equity funds relative to bond funds leads to a greater allocation to equities whereas simply increasing the **number** of funds makes participants shy away from equities in favour of “safer” bond or money market funds¹⁵.

Table 9: Extremeness Aversion						
Menu	Fund A	Fund B	Fund C	Fund D	Fund E	Mean allocation to equities
UCLA clone	Money Market	Savings	Insurance Contracts	Bonds	Diversified Equity	43%
TWA clone	Diversified Bond	Conservative Equity	Equity Index	Growth Equity	International Equity	68%

In a study¹⁸ to test this effect, an experimental menu was designed to replicate two actual plan menus offered in the United States by UCLA and TWA. For

convenience, we call these “clone” menus (Table 9). To simplify, each menu contained five funds. The UCLA menu consisted of one diversified equity fund and four non-equity funds (bonds, money markets, insurance contracts and certificates of deposits). The TWA menu, by contrast, contained one diversified bond fund and four equity funds of increasing levels of risk. Participants were divided into two groups (one for each menu) and each was asked to select one fund from his respective menu.

The results were revealing: In the first group (UCLA menu), allocation to equities was 43% while in the second group (equity-laden TWA menu) it was 68%. To the participants in the first group, the sole equity fund on offer represented the extreme point of the spectrum – seen as the lone wolf – and was avoided by the majority (57%).

This behaviour is clearly at odds with the Rational Choice Theory which postulates that investors make wealth-enhancing decisions based on their personal utility preferences. In the absence of a foundation in portfolio theory, it is understandable why investors can be swayed by the artificiality of the asset class distribution in this experiment.

3.2.3. When Heuristics Meet the Framing Effect

When poor menu design and heuristic decision-making combine, the outcome is invariably an inferior portfolio. In this case, it is effectively the menu design rather than the investor’s utility preferences that forges the asset allocation and portfolio construction path as illustrated by the example in Table 10. The matrix shows eleven menus containing twenty funds each, beginning with mostly equity funds (menu 1) and progressively adding more bond funds, until the latter predominates (menu 11). The menus in the extremities illustrate the point: The same investor could be pigeonholed into two vastly different (and most likely inappropriate) asset allocation regimes depending on

Table 10: Impact of Plan Design on Heuristic Decision Making (1/n invested in each fund)

Menu	Number of funds offered		Asset Allocation	
	Equity	Bond	Equity	Bond
1	15	5	75%	25%
2	14	6	70%	30%
3	13	7	65%	35%
4	12	8	60%	40%
5	11	9	55%	45%
6	10	10	50%	50%
7	9	11	45%	55%
8	8	12	40%	60%
9	7	13	35%	65%
10	6	14	30%	70%
11	5	15	25%	75%

the menu offered by the plan: 75% in equities and 25% in bonds in menu 1 and vice versa in menu 11. These divisions are therefore wholly arbitrary, bearing no relation to the investor's risk profile and return expectations.

3.3. Investment Underperformance

Table 11: DB/DC Plan Rates of Return Comparisons			
Plan by Asset Size	Median Return (%)		
	DB Plans	DC Plans	Δ%
Largest 20%	10.1	8.8	1.3
2nd	8.9	8.1	0.8
3rd	8.2	7.8	0.4
4th	7.4	7.6	-0.2
Smallest 20%	5.6	6.6	-1.0
Weighted	10.7	9.7	1.0

It is estimated¹⁹ that DC plans underperform their professionally-managed DB counterparts by 1%, based on asset-weighted median returns. The disparity varies depending on the size of the plan's assets, with larger DC plans showing

even greater underperformance. The situation is reversed only for the smaller asset quintiles, where DC plans outperform as shown in Table 11.

There are two main reasons for this large disparity: Higher costs and poor performance associated with DC funds. DB schemes often pay lower, "institutional" management fees. In our estimation, this factor alone can account for at least a quarter of the performance differential. Moreover, large DB schemes (top quintile) are able to get further preferential rates, which account for their above-average performance versus smaller DB schemes. Trustee fees are also crucial as they typically range from 0.5% to 1.0% of the plan assets annually, a substantial spread which is beneficial only to the larger plans. Equally importantly, DB plans approach their fund selection with greater diligence and care, not only finding better managers but also monitoring their performance with greater scrutiny. This is an area where DC sponsors can add tangible value to their members by improving their fund governance policies and procedure.

4. Putting it Together

4. Putting It Together

We have highlighted key member and sponsor challenges, identifying structural and behavioural drivers which are directly or indirectly responsible for them. These relationships have been juxtaposed in a matrix in Table 12. In summary, under-saving and poor retirement planning are linked to procrastination & inertia. Irrational decision-making stems from - or is amplified by - multiple factors, among which are poor menu design and the use of heuristics. Poor product understanding can be attributed to information overload and a general lack of investment knowledge. Inefficient portfolio construction has multiple drivers, including the framing effect, naïve selections, rule-of-thumb decision making and unstable preferences. The common thread linking most member and sponsor challenges is poor investment knowledge and understanding.

In the following section, we discuss solutions and strategies which sponsors can implement to address these challenges.

Table 12: DC Challenges & Their Drivers								
				Challenges				
				Under- saving/poor retirement planning	Irrational or poor decision- making	Poor product understanding	Inefficient portfolios	Under- participation
Stakeholders	Sponsors	1	Poor Menu Design		●		●	
		2	Information Overload		●	●		●
		3	Lax Governance					
	Members	4	Naïve Selections/Heuristics		●		●	
		5	Unstable Preferences		●		●	
		6	Inertia & Procrastination	●				●
	Joint	7	Poor investment Knowledge	●	●	●	●	●

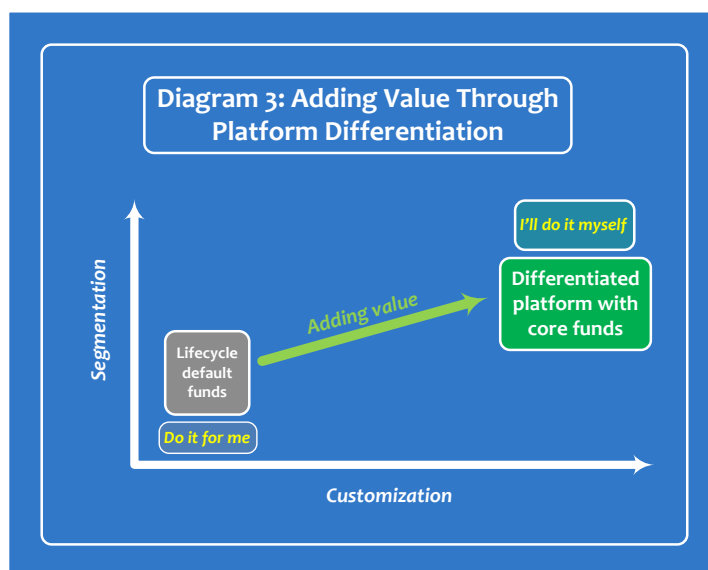
5. Insights, Solutions & Strategies

5. Insights, Solutions & Strategies

Plan members are not a homogenous group despite EOPIA's rather crude characterization of Max. Not only do they differ in their investment needs but also in their attitudes toward investing and their level of investment knowledge. At one end of the scale is the “do-it-for-me” majority, content to defer investment decisions to a third party.

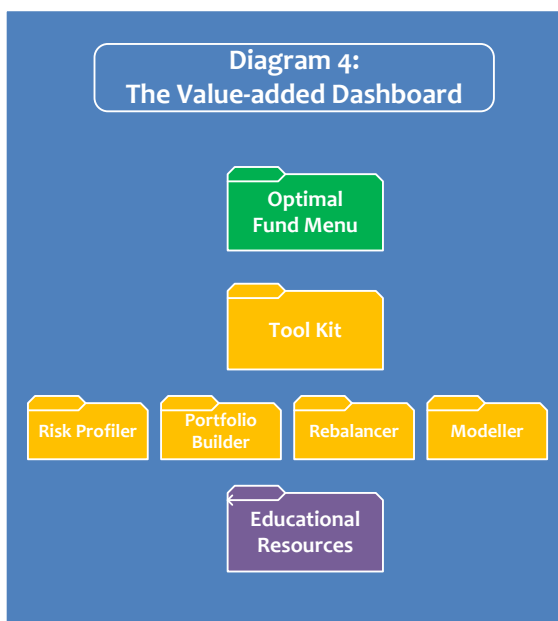
This group generally lacks investing skill and is understandably unenthusiastic about getting involved in what it perceives to be a complex or obtuse subject matter. By sharp contrast is the “I’ll-do-it-myself” contingent. These are proactive, independent-minded investors who prefer to be firmly in the driving seat of the decision-making process. Typically, they find investing enjoyable and approach it with confidence. Consequently, they stand to benefit most from the open architecture of a state-of-the-art platform, one which is fully equipped with a broad range of funds and an array of sophisticated tools to give them a free hand in engineering their retirement. This “silent minority” is by no means insignificant as it accounts for 38%¹ of the membership universe. Confining such individuals to restrictive menu options only serves to disengage them, contributing to plan underutilization.

The challenge for sponsors is to provide an optimal plan which caters sufficiently to both sets of attitudes, striking a commercially viable balanced between standardization and customization. The answer lies in differentiation through member segmentation and platform enhancement; in other words, standardization for one group and customization for the other as shown in Diagram 3. A dynamic platform should provide default funds for those who require implemented solutions (“do-it-for-me”) and a wide range of core and risk-profiled funds and supporting resources for the remainder (“I’ll do it myself”).



5.1. Plan Enhancement & Efficiency: Creating the Ideal Platform

Conceptually, such a versatile platform would consist of a menu of quality funds, interactive tools and resources to enable realistic risk-profiling and efficient and customized portfolio construction, rebalancing capabilities to keep investments on course, and educational resources to empower members to take charge of their retirement future. A stylized dashboard containing these elements is shown in Diagram 4.



We previously discussed the theoretical and practical necessity for these tools and resources and will cover the topic of an optimal fund menu in detail in Section 5.3. We now turn our attention to a vital function for all plan members which is the process of constructing and maintaining a customized efficient portfolio.

5.2. Constructing & Maintaining Customized, Efficient Portfolios

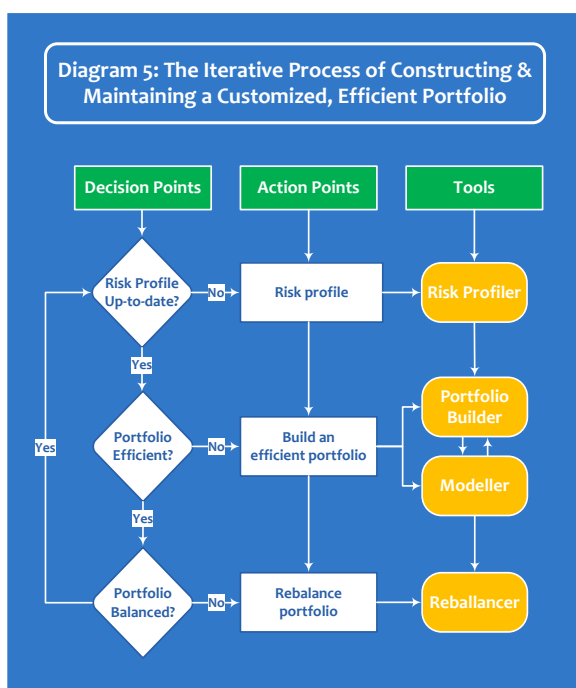
Fashionable “default” funds are the mantra of sponsors who believe that “something is better than nothing”, the rationale being that at least Max is being encouraged to invest. In practice, however, “one size fits some” is closer to the mark and only a short hop from “one size fits none”!

Default options are merely variants of a “balanced fund”, a diversified hybrid containing a mixture of mostly equities, bonds and cash. The equity component range is typically 30%-80%, depending on whether the fund is structured as “conservative”, “moderate” or “aggressive” - vague terms at best. However, the



asset allocation in each fund is static, so the onus is squarely on members to ensure that it is appropriate for their stage of life. Therein lies the main stumbling block with default funds: Most plan participants seldom engage in the decision-making process and are effectively bystanders to it. For sponsors, this can potentially be a fiduciary liability in the making with unsavoury visions of dissatisfied employees (or future retirees) seeking to apportion blame should their pensions fail to live up to expectations, however unreasonable.

Sponsors aiming to upscale their HR value proposition can view this potential problem as a compelling marketing opportunity to provide plan members the tools and know-how to create customized, efficient portfolios for their retirement. This approach not only makes good investment and governance sense, but is also a sensible and strategic brand-enhancing exercise to deliver a



quality investment platform with tangible employee appeal. Engineering a sophisticated but user-friendly retirement plan is therefore a matter of customization not standardization. To use a tailoring analogy, the suit must not only look good but also be fit for purpose – and the same goes for the tailor!

There are three characteristics to a well-constructed portfolio: It is **customized, efficient and well maintained** – we call this the **C-E-W principle**. An efficient portfolio “sits”

on the efficient frontier; a customized portfolio is constructed according to a specific risk profile; a well-maintained portfolio is regularly rebalanced to ensure that its original strategic asset allocation is not compromised. Accordingly, CEW is a dynamic process consisting of three iterative decision points (Diagram 5) each either leading to another decision point or a point on an action path. Plan members should implement the CEW process as a matter of personal policy to ensure they are on course for achieving their retirement investment objectives.

5.2.1. The Efficient Frontier: Why Does It Matter?

In Section 2.4.4., we presented the efficient frontier as a hyperbola of all the optimal risk/return outcomes possible from the combination of the six funds offered by our hypothetical plan sponsor (Table 6). At the heart of this concept is the mean variance optimization (MVO) engine, the algorithm that engineers the efficient frontier by **minimizing risk for a given level of return or maximizing return for a given level of risk**. Every point on the frontier is therefore “efficient” in the sense that it is optimal – no higher return can be had for the specified level of risk and risk cannot be reduced further for the given level of return.

Thus, a portfolio that is positioned on the frontier is efficient; otherwise, it is either unattainable (i.e., the risk/return trade-off is not possible) or undesirable (since it is sub-optimal). As such, the frontier is a reference baseline – or a relative “benchmark” – for assessing any portfolio constructed of the funds which created it. The consequence of deviating from the efficient frontier is a portfolio which under-performs unnecessarily.

5.2.2. The Importance of Risk-profiling: Index of Risk Aversion

In preceding examples of portfolio optimization, we simply **qualified** investor risk tolerance as “low” or “relatively high” without assigning to it any meaningful value. Therefore, the portfolios created, although fully optimized, bore only a passing resemblance to our investor’s “real” risk profiled portfolio. In other words, although the proportions were right, the suit was not made to measure for Max! To construct a customized portfolio for him, we must **quantify** his risk tolerance through risk profiling and assign it a score. This score then becomes an input in the portfolio construction process.

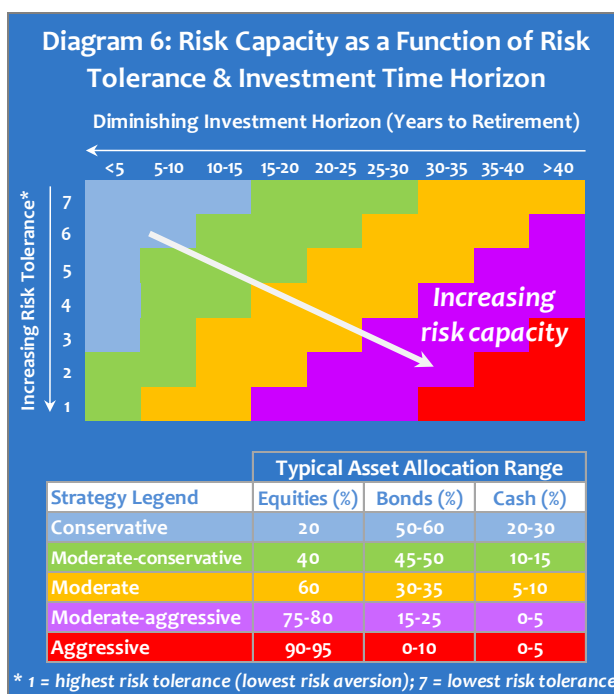
Behavioural finance refers to Max’s attitude toward risk as his **cognitive bias**. In portfolio theory, this bias can be expressed as an **index of risk aversion (IRA)**²⁰. Since investors are inherently risk-averse, risk profiling terminology is based on “aversion” rather than “tolerance”, but these terms are interchangeable provided we keep in mind that they are inversely related. Conventionally, IRA is scaled 1 - 7, “1” being the lowest risk aversion (highest risk tolerance) and “7”, the highest

(lowest risk tolerance). (See Appendix I for a discussion on the construction of IRA).

5.2.3. Differentiating Between Risk Tolerance & Risk Capacity

Max's risk profile is not static but evolves over time and with circumstances, so relying on a questionnaire to generate a one-off risk score is simplistic, if not problematic. One important factor affecting risk profile is investment time horizon: How long before Max reaches retirement? The answer provides an indication of his **risk capacity**. If risk tolerance is defined as the risk an investor is **willing** to take, then risk capacity is the risk he can **afford** to take. In the context of retirement planning, the shorter this

time, the lower the investor's risk capacity. Therefore, Max's risk profile is a function of his risk tolerance as well as his risk capacity, which are complementary and dependant, with the latter constraining the former. For example, if Max's risk aversion score is 5 (quite risk averse) but he has <5 years to retirement, he must adopt a more conservative asset allocation strategy than if he had 20 years to retirement, as shown in Diagram 6. Other points of note in the diagram are that risk capacity increases with time to retirement and higher risk tolerance and that the five broad asset allocation strategies shown rely roughly on the {100 – age} heuristic for equity allocation. For example, an investor aged 45 (assuming 25 years to retirement) with a risk aversion score of 5 falls in the "moderate" risk capacity glide path for which the rule-of-thumb allocation to equities is roughly 60%.



The corollary is that Max should be given every opportunity to regularly monitor and update his risk profile, preferably with the assistance of a competent (and independent) financial advisor, as part of an on-going financial health check. This

exercise will enable him to make appropriate modification to his portfolio's asset allocation, ensuring that he is on course to meet his retirement objectives.

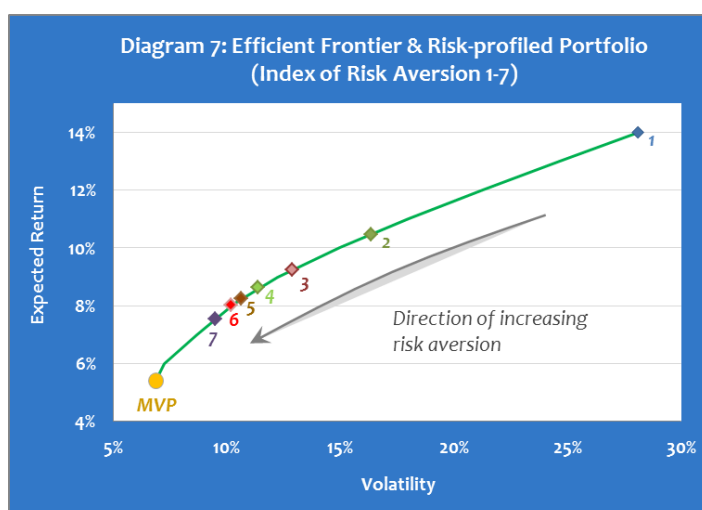
Most commercially available risk-profiling questionnaires incorporate risk capacity in the formulation of the risk profile score. Ideally, however, these questionnaires should be customized to sponsor specifications.

5.2.4. Anatomy & Mechanics of a Customized Portfolio

Once Max has been risk-profiled, he is ready to build a customized, efficient portfolio using the efficient frontier (Diagram 2) for the six funds offered by his pension plan. In Diagram 7, this portfolio is number 5, corresponding to Max's IRA score of 5. Also shown are the portfolios corresponding to IRAs of 1 to 7. In practice, this construction involves maximizing²¹ "utility" for each level of risk aversion, where utility is:

$$U_p = E_{r_p} - (\frac{1}{2} * IRA * \sigma_p^2)$$

Utility is simply Max's preference score and is used for ranking purposes, indicating the value he puts on a given investment – the higher the utility score, the greater the preference (see Appendix II for a discussion on utility). The formula states that in order to arrive at a unique utility value for a portfolio (U_p) at a specified level of risk aversion, the expected return (E_{r_p}) of that portfolio must be adjusted by a risk penalty factor equal to $(IRA * \sigma_p^2)$ where (σ_p) is the volatility of the portfolio. Max's customized portfolio has an expected return of 8.3% and volatility of 10.6% and consists of 80.1% fund 4, 15.5% fund 1 and 4.4% fund 2 with no allocation to funds 3, 5 & 6. Max now has a fully-customized, efficient portfolio. Using his modeller tools, he can apply advanced analysis to this portfolio. For instance, sensitivity analysis ("what-if" questions) to understand



how changing his expected risk/return parameters for each fund will affect the efficient frontier and therefore the complexion of his portfolio. Similarly, with scenario analysis he can assess outcomes under his optimistic and pessimistic views of the future using different measures of uncertainty, including tail risk. Finally, decision analysis using simulation techniques can help Max assign a specific probability to each possible wealth outcome, allowing him to observe and examine the range of outputs graphically and dynamically.

5.2.5. Staying on Target: The Role of Portfolio Rebalancing

Once Max has constructed a customized, efficient portfolio, it is imperative that he keep it on target by rebalancing it on a regular basis, such as quarterly. Rebalancing involves maintaining the initial asset allocation mix by a proportional offsetting/distributing of the gains and losses, as illustrated in Table 13.

Max has a portfolio worth €100,000 invested in 3 funds, each representing a distinct asset class. The original strategic asset allocation is indicated on line 1 and the corresponding asset monetary values on line 2. For the rebalancing

Table 13: Rebalancing a Portfolio					
Line	Item	Fund (representing asset type)			
		1	2	3	Total
Position at inception					
1	Allocations	45.0%	35.0%	20.0%	100%
2	Value (€)	45,000	35,000	20,000	100,000
Position at rebalancing					
3	Allocations	46.2%	29.2%	24.5%	100.0%
4	Allocation change	1.2%	-5.8%	4.5%	0.0%
5	Value (€)	49,000	31,000	26,000	106,000
6	Change (€)	4,000	-4,000	6,000	6,000
7	Change	8.9%	-11.4%	30.0%	6.0%
Rebalancing actions and positions after rebalancing					
8	Rebalanced value (€)	47,700	37,100	21,200	106,000
9	Net change to initial allocation (€)	2,700	2,100	1,200	6,000
10	Individual fund adjustments (€)	-1,300	6,100	-4,800	0
11	Rebalancing action	Sell	Buy	Sell	-
12	Rebalanced allocations	45.0%	35.0%	20.0%	100%

period, funds 1 & 3 show gains whereas fund 2 shows a loss (lines 5-7), distorting the original allocations (line 3-4), especially for funds 2 & 3 (although in opposite directions). To rebalance this portfolio and restore it to its original allocations, the monetary value of each fund must be adjusted (line 8). For fund 1, for example, this involves increasing the initial allocation by €2,700 (line 9) but locking in part of the gains (lines 10 & 11) by selling the equivalent of €1,300 of the fund. These proceeds, as well as those from the sale of fund 3, are used to buy more of fund 2 (€6,100), which has underperformed, offsetting exactly the buy/sell actions. The net effect is the restoration of Max's original strategic asset allocation (line 12).

This allocation should be periodically reviewed and modified as Max's time to retirement contracts, preferably with guidance from a competent financial advisor.

5.3. Optimal Fund Menu Design: Five Essential Attributes

We define a well-designed fund menu by five attributes: Quality, quantity, range, breadth, and balance. When each of these is at its optimal level, the combined affect is improvement in overall effectiveness, transforming the menu from a mere collection of funds into a powerful investment tool. Such refinement helps counteract - rather than foster - design-related behavioural problems such as the framing effect or under-participation due to information overload as discussed previously. Equally important is how an optimal fund menu contributes to better investment returns by improving the quality of funds on offer.

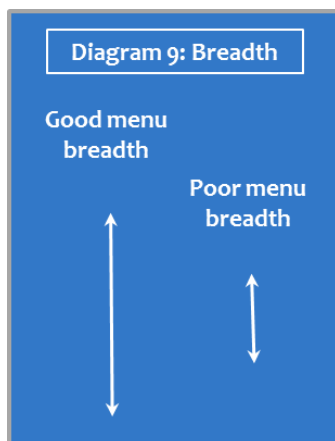
Quality: The key measure of a fund's quality is its performance, often relative to a designated benchmark. Such a fund would be expected to outperform this benchmark, net of management fees, more often than not. In addition, this outperformance would be attributable to the fund manager's skill rather than luck. In other words, it would be statistically significant. A number of risk-adjusted performance measures can be used as diagnostic tools to ascertain this skill (or otherwise), such as Sharpe Ratio, Information Ratio, Treynor Ratio, Alpha and Jensen's alpha.

Quantity: Although there is no hard and fast rule as to what constitutes an optimum number of funds in a menu, research shows that the range is 13-32. Beyond this point, predicated member participation drops off sharply. In practice, the range for plans of all sizes is 12-30 with a median of 18, excluding target-dated funds¹⁶, although these are slightly lower for smaller plans. If target dated funds are included, the figures rise to 15 & 37 respectively, with a median of 24.

Range: We define range as the degree to which a fund menu is diversified **across** asset classes - it is the horizontal component of menu diversification (Diagram 8). A good menu should provide sufficient exposure to the full range of asset classes, namely equities, fixed

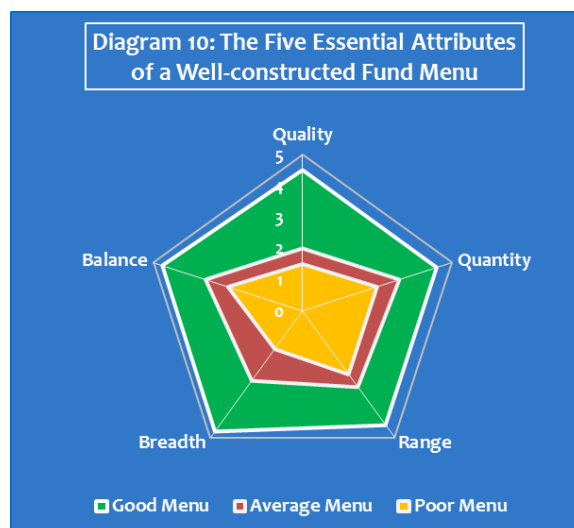


income (including “risk-free” government bonds), alternatives (including some or all of: hedge, commodities, structured products, private equity and infrastructure), property and cash.



Breadth: We define breadth as the degree to which a fund menu is diversified **within** each asset class - the vertical component of menu diversification (Diagram 9). Good breadth indicates exposure to the full spectrum of risk/return trade-offs provided by each asset class. For equity funds, for example, breadth captures diversity along geographical (e.g., developed, emerging or frontier economies), market capitalization (e.g., small, medium or large) and sectoral dimensions. For bonds, it reflects diversity in region, credit quality (e.g., investment grade vs high-yield) or credit type (corporate vs sovereign). Two subsets of breadth are sponsor preference for active versus passive funds (see Appendix III for further discussion) as well as the spread across asset management companies. Selecting funds from a variety of fund providers rather than a specific one enhances breadth and reduces operational risk.

Balance: This attribute gages the proportionality of the assets represented by the fund menu. For instance, historically equity funds dominate DC menus, accounting for 40%-50%, followed by bonds (20%-25%), property, alternatives and cash. “Balance”, therefore, is a measure of this tilt. Coincidentally, the order above roughly reflects the long-term asset allocation of a balanced fund.



We can combine these attributes into a single quantitative tool for menu design evaluation with the aim of implementing appropriate remedial action, if required. Using a spider diagram, each attribute can be measured and plotted on a user-defined scale, here shown as 0-5, 5 being the highest score. A well-designed menu distinguishes itself with a high score (not necessarily maximum) along every axis,

forming a balanced and symmetrical web as shown by the green menu in Diagram 10. Conversely, a poorly-designed menu, shown in orange, plots a contracted and asymmetrical web due to a number of deficiencies, in this example quality, range and breadth. These areas of sub-standard design should be addressed with specific corrective action(s). For instance, the “quality” attribute can be evaluated based on the number of funds which have a multiple trailing period Information Ratio or Sharpe Ratio below a specified threshold. These poorly-performing funds can then be replaced either with better actively managed funds or equivalent index funds. We discuss this topic in greater detail in Section 5.5.

While the menus shown in Diagram 10 are hypothetical, they do reflect commonly observed deficiencies in real DC plans, most disconcerting of which is poor fund quality.

5.4. Investment Education: Empowerment through Learning

We have highlighted the lack of member investment knowledge as the undercurrent for several of the challenges facing sponsors in their goal of encouraging employees to engage with their plan and better prepare for retirement. The fact begs the question: Is investment education a need or a luxury? In a global survey⁸, a series of questions were put to 14,400 current employees in 15 countries: “Which, if any, of the following would encourage you to save for retirement?” One of the options presented was “financial education”: 18% of the respondents ticked the box. This is compelling evidence that a sizeable segment of the working population recognises a need for financial education. Indeed, research by several financial service providers and asset management companies has repeatedly echoed this sentiment. Yet only 20% of sponsors offer financial education to their employees as a matter of course¹⁰.

One explanation for this could be that academic research for establishing a link between financial education and financial literacy has yielded inconclusive results. While there is positive correlation between financial literacy and desirable behavioral outcomes, such as good investment practices (and conversely, positive correlation between poor financial literacy and poor investment practices), the connection between financial education and financial literacy is less clear.

Nevertheless, studies suggest that, at the very least, financial education “*improves financial product awareness and individuals’ attitudes towards making financial decisions*”²² and “*financial education in the workplace can exert a strong [positive] influence on personal financial decisions.*”²³.

What constitutes plan member investment education? This is a question fraught with misconceptions and pitfalls. Often investment education is furnished “independently” by product providers as part of a bundled package. In this case, it is rarely little more than glorified marketing literature. Similarly, “education” through financial advisors is tainted with the commission incentive – the dreaded “product push”. However, what suits the advisor’s revenue targets may not be in the best interest of the participant. Finally, when discrete investment education is provided by a sponsor, it tends to be generic and aimed at Max, “telling” him what he should do rather than educating him into an informed investor.

An effective investment education program should therefore be customized and empowering, aiming to **reform** Max into an independent, knowledgeable investor able to take charge of the decision-making process himself. Such a program should help him develop a practical appreciation of key investment concepts such as the relationship between risk and reward, the characteristics of basic asset classes, the role of correlation, the importance of diversification, and the science & methodology of portfolio construction and maintenance. In short, good education should be the foundation of good investing.

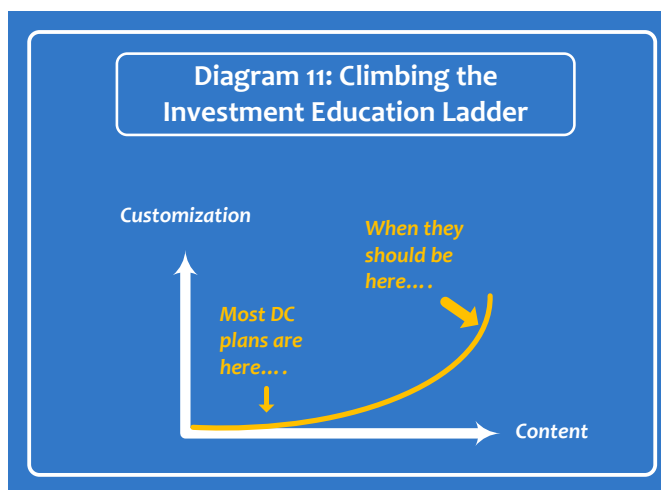
It is encouraging that regulators are being prompted by the industry to address this issue, albeit indirectly. An example in case is a suggestion in a recent consultation document published by The Pensions Authority of Ireland²⁴ with respect to improving governance for member communications, known as Code 10:

*“Expand code to include scheme promotion of membership, adequate contribution levels and **rational investment decision-making behaviours**” (emphasis added)*

The last comment begs the question: “How are members to be induced into **rational investment decision-making behaviours?**” On this point, the document is curiously silent. We propose that investment education can go a long way toward enabling them to do so. Regulators should therefore take heed and address the

core issue of investment education inadequacy in DC plans. How can this be done? What actions should sponsors take to enhance their investment education offering? What does a well-designed investment education program look like? Finally, what should the role of regulators be?

To climb the investment education ladder, sponsors should consider an eclectic, customizable content that caters to the diverse profiles and needs of plan members (Diagram 11). We recommend three components to this program:



- Basic principles: The how's and why's of key concepts in portfolio theory
- Product knowledge: A practical, nuts-and-bolts description of each product and the relationships among these products (e.g., how equities and bonds interact in combination)
- Platform understanding: A navigational how-to of investment resources and tools on offer by the sponsor, preferably in the above context

In terms of mode of delivery, seminars, workshops and meetings should be the top priority for sponsors as they have been found to be most effective. Research shows that educational seminars lead to “significantly higher rates of participation and contributions, at least when the frequency of these offerings is high”²³. This is corroborated by an industry survey in which 54% of plan sponsors declared these three methods as “very effective”²⁵. It is noteworthy that the latter also found that while 98% of sponsors use “written materials for communicating investment concepts” only 22% find it “very effective”.

As for regulators, they can address this issue by mandating that sponsors provide a structured investment education program along the lines suggested in this paper as part of their suite of pension services. While members would not be required to partake in investment education, they would have the option to do so, especially those in the “I’ll do it myself” category.

A less obvious but significant dimension to the need for educational empowerment and investing self-reliance is highlighted by the introduction of “destructive” regulations, such as the Retail Distribution Review (RDR) in the UK. This legislation, which came into force in 2013, has radically altered the landscape of the financial advisory business in Britain by forcing independent financial advisors (IFAs) to change their traditional commission-based model to a fee-based, relationship-driven one. As a result, these IFAs can now only accept clients who have investible assets in excess of £150,000²⁶. In this new model, many DC members – and indeed non-DC investors – will not be economically viable IFA clients. For this group, the options for obtaining financial advice are rather limited²⁷: By and large, they would have to fend for themselves or resort to advice from non-professionals, such as friends or relatives - hardly a sensible approach.

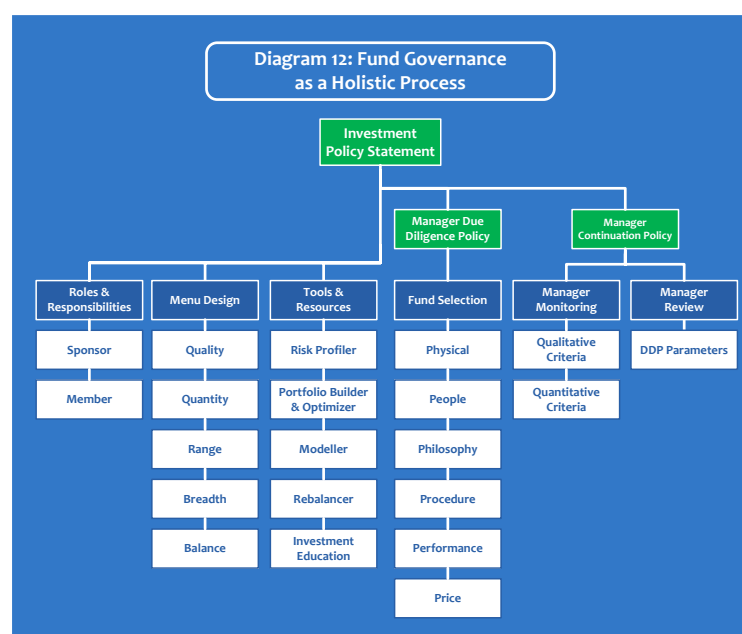
5.5. Fund Governance

The practice of governance is a **holistic process** encompassing all aspects of the sponsor versus member relationship. At an elementary level, it spells out the broad responsibilities of each party. At a granular level, it defines the parameters of the duties that fall within the immediate remit of the sponsor. These include: Selecting quality funds; monitoring the performance of these funds at reasonable intervals; making provisions for on-going member communications; providing educational resources and technical tools; and selecting and monitoring trustees.

The codification of these responsibilities into a formal policy document is the essence of good governance. One such document is the **Investment Policy Statement (IPS)**, an over-arching instrument which enumerates both trustee and member roles & responsibilities. Regulators are increasingly calling for such robust governance practices for DC plans, placing the burden of investment due diligence and oversight - as well as fiduciary duty toward members – squarely on sponsors. Yet many sponsors appear to be surprisingly lax in this regard. Nor, it seems, is there uniformity in governance practices among sponsors since they have considerable latitude in choosing their approach. Highlighting these issues, a UK survey¹⁰ revealed that 12% of the sponsors never conduct an audit of their funds’ performance and 10% do so but irregularly. While such pre-emptive actions are not entirely obligatory, they are nevertheless prudent and make for good business, legal and fiduciary sense.

A telling aspect of the IPS is that the sponsor is not responsible for establishing investment parameters for individual members. Given that DC plans are “self-directed”, members are ultimately responsible for investment-related decisions and actions: Assessing and establishing their risk tolerance; setting risk/return objectives and constraints which reflect their risk tolerance, financial circumstances and goals; making appropriate asset allocation decisions; and ensuring that their portfolios are rebalanced in a timely and efficient manner. Implicitly, therefore, members are obliged to acquire (or already have) sufficient investment knowledge and know-how to be able to make these critical decisions, provided that the plan sponsor has furnished an adequate educational and technical framework for this purpose.

In terms of achieving the goal of providing a well-designed fund menu, sponsors should focus specifically on implementing robust, institutional grade practices for manager selection, monitoring & review. Two sub-sets of the IPS document deal specifically with this subject: The **Due Diligence Policy (DDP)** and the **Manager Continuation Policy (MCP)**. DDP outlines the criteria for the initial fund manager selection process. MCP, on the other hand, deals with the monitoring and review of managers once they have been selected. The ultimate aim of MCP is to replace those fund managers who do not add value and retained those that do but in such a way as to minimize turnover, and therefore cost. An example of a well-rounded governance process is provided in Diagram 12.



5.5.1. Selection Due Diligence

The Due Diligence Policy establishes the framework for evaluating a fund management company, particularly the fund manager and his team. This top-down analysis typically consists of a pyramid of six steps, the “6Ps”, each of which can be assigned a subjective weight.

Physical: At the top of the pyramid is the organizational foundation of the fund company as a business entity, including its size, financial strength, brand name and recognition, administration, area(s) of expertise, competitive advantage, and resources & technology.

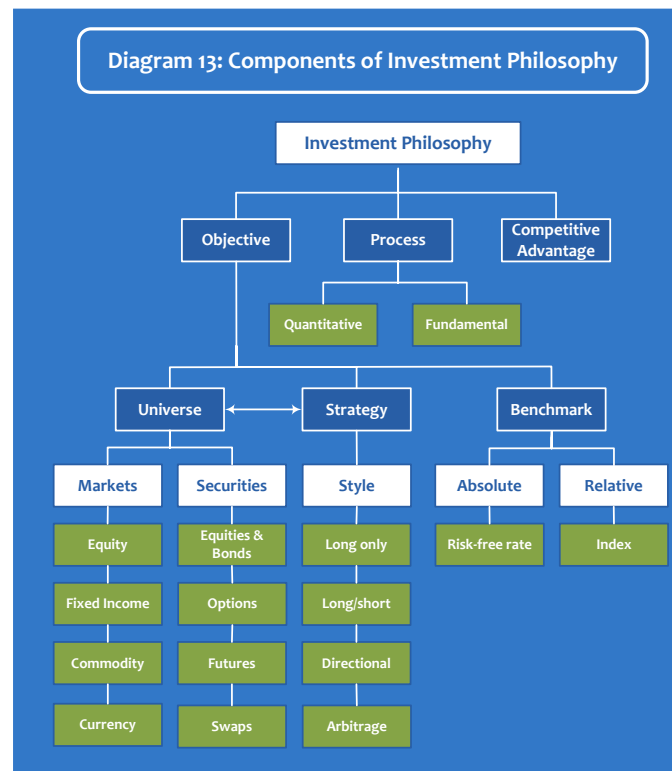
People: This is a more formal evaluation of the fund management team, namely the lead fund manager - his reputation, track record and remuneration structure - and his analysts and support staff. The stability of this team, as a function turn over, is especially relevant as excess personnel churning often hints at wider, unresolved organizational issues.

Philosophy: This phase of the due diligence aims to answer three key questions about the fund manager’s investment mandate: Objective(s), process and competitive advantage. Details of each topic are shown in Diagram 13.

To understand these objectives fully, sponsors should ask a number of questions:

- What is the fund manager’s investment universe, i.e., the market(s) in which he operates?
- Are these markets broadly (e.g. equities, bonds, commodities, currencies) or narrowly (e.g., high yield domestic corporate bonds) defined? Or perhaps there are no restrictions (as in total or absolute return mandates)?
- What are the principle types of securities used (equities, bonds, derivatives, including futures, swaps or options)?
- How much leverage is employed?
- What is the specific strategy pursued or primary approach used to run the fund (e.g., long only, long/short, absolute return, macro, directional)?
- Is there a specific benchmark?

Investment process details the methodology used by the manager to generate returns. For example, is the security selection and the buy/sell decision made using “black box” algorithms or fundamental research?



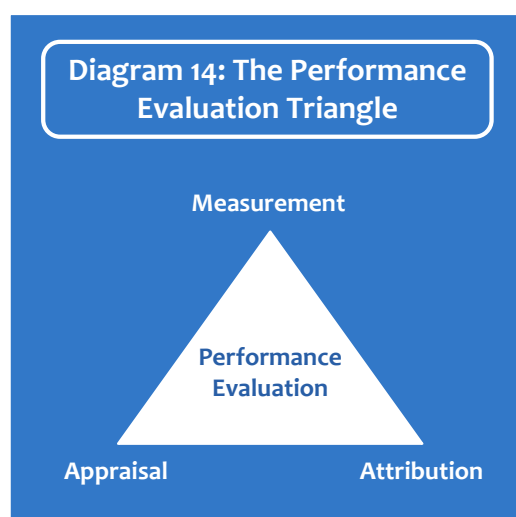
Competitive advantage probes a manager’s ability to generate alpha: How is this done? Is there alpha persistency? Does the manager demonstrate superior information filtering and gathering skills? The answers to these questions should be supplemented with (and verified through) evidence obtained from performance appraisal metrics.

Procedure: In examining a fund manager’s operational procedures, two issues are of paramount importance: Operational risk and investment process risk. The former includes unintended errors (such as in processing trades), conflicts of interest (such as rouge traders) or fraud. A due diligence review aims to establish whether there are sufficient internal checks and balances to forestall some, if not all, of these risks.

Investment process risk can be considered a sub-set of operational risk and is the degree to which the implemented investment strategy deviates from the fund's stated mandate. An example is **style drift** where a manager deviates from the mandated strategy in search of a higher return (possibly assuming higher risk). Style drift can be detected through the use of quantitative tools as well as qualitative analysis of the fund manager's performance. One such tool is the fund's **beta**: By tracing its evolution over time, it can be determined whether a fund manager has stayed on course with the mandated strategy or deviated from it to a significant degree. This deviation is referred to as the **non-stationarity** of beta (CAPM assumes beta constancy). Examples of non-stationarity are beta creep and beta expansion (market timing).

Uncovering investment process risk directly is at times problematic because of lack of operational transparency. This is generally the result of a well-founded desire by fund managers to protect what they consider to be their competitive advantage. For instance, a manager who uses proprietary trading algorithms will naturally be guarded about divulging too many details about his trading practices. Similarly, a good market timer who successfully manages beta expansion to generate extra alpha without compromising his benchmark would consider this as a unique skill-set to be safeguarded. Therefore, the due diligence process becomes a delicate balance between a sponsor's "need-to-know" and a manager's "need-not-to-divulge", both of which are equally valid imperatives.

Performance evaluation: This is an essential part of the due diligence process and consists of three steps: Measurement, appraisal and attribution (Diagram 14). Measurement is the calculation of a fund's rate of return (e.g., geometric versus arithmetic) over specified time frames (e.g., discrete or trailing periods). Appraisal is the assessment of a manager's performance. It answers the question: "How well did the manager do?" through a formal score card for various performance metrics. In most cases, appraisal is a relative assessment, comparing the manager's performance to that of a benchmark. If



there is no formal benchmark (e.g., a total return fund), then an absolute baseline should be selected (e.g., the risk-free rate). Finally, attribution is an examination of the sources of the fund's returns, namely strategic asset allocation, market timing (tactical asset allocation), and security selection.

A skilled manager is expected to outperform his assigned benchmark more often than his less-skilled peers although this may be marked with periods of underperformance. Therefore, it is performance in aggregate that matters – the movie rather than the static picture. A bird's eye view should demonstrate not only that a manager generated persistent risk-adjusted excess returns, but did so in a statistically significant manner (i.e., not by mere luck). A number of risk-adjusted performance measures (RAPM) should be used to ascertain a manager's skill level, as discussed in Section 5.5.3.

Price: Refers to active management fee(s). This is what the sponsor is willing to pay for what it perceives to be the fund manager's unique expertise (i.e., generating superior risk-adjusted returns over a benchmark). We have emphasized the importance of measuring performance on of net-of-fee basis. It is common knowledge that the average active fund fails to beat its benchmark on this basis and that non-value added managers are the norm rather than the exception²⁸. Therefore, the caveat emptor with active funds should be that *“the large print giveth and the small print taketh away!”* “Active” fund selection, therefore, should begin with the fine print!

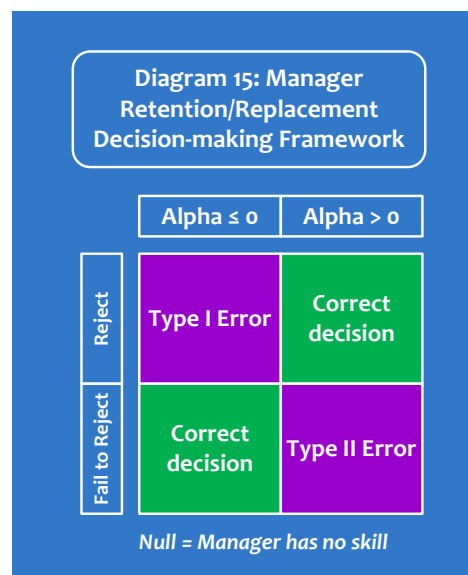
5.5.2. Performance Monitoring & Review

The Manager Continuation Policy provides a framework for the on-going monitoring and review of fund managers once they have been selected. MCP should be written as a formal, coherent and consistent methodology document and be ratified and promulgated by the sponsor, thus adding continuity and credibility to the governance process.

The ultimate objective of MCP is to advise sponsors in the decision to retain or replace a manager while minimizing turnover and associated costs. The decision is a complicated one since superior managers can have periods of poor performance while inferior managers may register stellar returns by random chance, clouding

the picture with performance “noise”. Therefore, the retention/replacement decision is best made within an appropriate statistical framework such as a hypothesis test in which the null is that the manager has no skill, i.e. generates zero mean excess return (with a normally-distributed variance) versus the benchmark. The illustration in Diagram 15 uses alpha as a measure of skill, but sponsors can employ any other suitable performance criterion. In the left hand column, null is true ($\alpha \leq 0$); in the right hand column, null is false ($\alpha > 0$). Within limits, the significance

level can also be quite flexible, depending on how rigorous the sponsor wishes to be, such as 5% (95% confidence interval) or 10% (90% confidence interval). If a manager’s alpha distribution over a given period falls consistently outside the specified confidence boundary, then the sponsor will reject the null and, by implication, accept that the manager can generate positive alpha. On the other hand, if alpha falls inside the boundary, then the sponsor will “fail to reject” the null, implicitly accepting that the manager does not generate positive alpha.

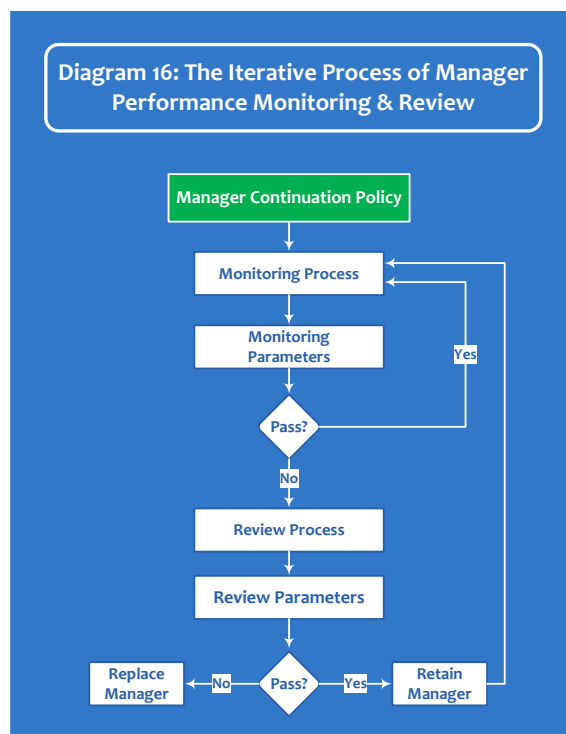


This framework helps minimize two types of statistical errors as shown in Diagram 15: Type I, in which the null is rejected when in fact it is true (leading to the retention of an unskilled manager) and Type II, in which the null is not rejected when it is in fact untrue (leading to the dismissal of a skilled manager). There is a fine balance of cost-effectiveness between setting the significance filter either too fine or too coarse and the sponsor must make the judgement call as to the appropriate level: A coarse filter will be prone to a Type I Error; a fine filter to a Type II Error. Almost by default, sponsors are prone to committing a Type I rather than Type II error, therefore continuing to retain unskilled managers. This is often due to a poorly-designed (or completely lacking) initial diligence process or the inadequacy of the subsequent MCP, or both.

The manager continuation assessment is a two-step process: Monitoring and review (Diagram 16). Monitoring is the on-going phase of MCP and its goal is to forewarn the sponsor as early as possible of any signs which might indicate deterioration in the fund manager’s performance. There is no standard approach

to formulating monitoring criteria and sponsors are at liberty to define these as required. However, it is prudent to combine qualitative and quantitative criteria to get a detailed insight into any material changes in the manager's operations or investment strategy. The quantitative criteria can be the same as those used for performance evaluation in the due diligence phase. Sponsors should have a communication protocol which obliges the fund manager to convey this information at pre-agreed intervals either in writing or in face-to-face meetings, preferably both. However, the sponsor, either directly or through its advisory consultant(s), should establish separate means of independently obtaining and assessing this information as well.

More often than not, routine monitoring is quite uneventful and the sponsor is not required to take any remedial action. However, occasionally it raises a red flag which warrants escalation to the review step. This step essentially replicates the manager selection due diligence process, re-examining in detail both the organization and the fund management team as if from scratch. Failure to pass this review should result in the manager's replacement.



5.5.3. Risk-adjusted Performance Measures (RAPM)

We have selected five RAPM for review, four benchmark-related, namely Information Ratio, Treynor Ratio, Alpha and Jensen's Alpha. Table 14 summarizes the key features of each, including definitions of their risk and return parameters.

Sharpe Ratio (SR) expresses a manager's added value per unit of total risk. Added value is defined as excess return over the risk-free "hurdle" rate and total risk as volatility, which encompasses both systematic and non-systematic risk. Therefore, the ratio enables an "apples to oranges" comparison among funds. SR is a relative

measure, so there is no defining cut off value for it. As a rule, the higher the ratio, the better the fund.

Information Ratio (IR) is a risk-adjusted return measure which homes in on a manager's skill by answering the question: "How successful was he in the active positions that he took?" A good IR should be positive and as high as possible, in practice ≥ 0.5 .

Table 14: Risk-adjusted Performance Measures (RAPM)

Evaluation Metric	Measure of Return	Measure of Risk	Formula
Sharpe Ratio	Excess return over risk-free rate	Portfolio volatility	$\frac{r_p - r_f}{\sigma_p}$
Information Ratio	Excess return over benchmark (a.k.a. active return)	Volatility of excess return (a.k.a. active risk or tracking error, TE)	$\frac{r_p - r_b}{\sqrt{\frac{\sum_{i=1}^n (r_{p,i} - r_{b,i})^2}{n-1}}}$
Treynor Ratio	Excess return over risk-free rate	Beta (systematic risk)	$\frac{r_p - r_f}{\beta_p}$
Alpha	Excess return adjusted for beta	Beta (systematic risk)	$r_p - \beta_p(r_b)$
Jenson's Alpha	Excess return over risk-free rate adjusted for beta	Beta (systematic risk)	$r_p - [r_f + \beta_p(r_b - r_f)]$

r_p = portfolio return
 r_b = benchmark return

σ_p = portfolio volatility
 β_p = portfolio beta (systematic risk)

r_f = risk-free rate
 n = number of periods

Treynor Ratio (TR) measures a manager's value-added as excess return over the benchmark per unit of market risk, beta. Like SR, TR is also a relative measure with no hard value. As a rule, the higher the ratio, the better the fund.

Alpha (α) is a manager's absolute added-value, adjusted for market risk, beta. It is expressed as a percentage figure. A more refined version of alpha is Jenson's Alpha (α_j) which incorporates the risk-free rate, providing a better-rounded picture of the manager's added-value.

To illustrate a practical application of RAPM, Table 15 examines investment data for five hypothetical funds and their benchmark. For the evaluation period, rows 1-5 show the net and excess returns and risk measures for each fund. In nominal terms, Fund 1 has the highest returns, followed by Fund 5. Funds 3 & 4 have

positive returns, but trail Funds 1 & 5 significantly. Fund 1 brings up the rear with a negative excess return.

In rows 6-10, we have applied the five RAPM filters to obtain a picture of each fund's risk-adjusted performance. Row 6a compares the Sharpe Ratio of each fund to that of the benchmark. The results are summarized in rows 11-16 where funds are ranked for each metric on a scale of 1-5, 1 being the highest.

Table 15: Application of Risk-adjusted Performance Measures								
		Fund 1	Fund 2	Fund 3	Fund 4	Fund 5	Benchmark	Risk-free
Risk & return data	1 Net Return	6%	18%	9%	10%	13%	8%	2%
	2 Excess Return	-2%	10%	1%	2%	5%	n/a	n/a
	3 Volatility	12%	14%	11%	18%	19%	11%	0%
	4 Tracking Error	10%	20%	6%	15%	7%	n/a	n/a
	5 Beta	0.90	1.80	0.75	1.65	1.05	1.0	n/a
Evaluation metric	6 Sharpe Ratio	0.33	1.14	0.64	0.44	0.58	0.55	n/a
	6a Sharpe v Benchmark	0.61	2.10	1.17	0.81	1.06	n/a	n/a
	7 Information Ratio	-0.20	0.50	0.17	0.13	0.71	n/a	n/a
	8 Treynor Ratio	4.4	8.9	9.3	4.8	10.5	n/a	n/a
	9 Alpha	-1.2%	3.6%	3.0%	-3.2%	4.6%	n/a	n/a
	10 Jensen's Alpha	-1.4%	5.2%	2.5%	-1.9%	4.7%	n/a	n/a
Rankings according to each metric	11 Excess Return	5	1	4	3	2		
	12 Sharpe Ratio	5	1	2	4	3		
	12a Sharpe v Benchmark	5	1	2	4	3		
	13 Information Ratio	5	2	3	4	1		
	14 Treynor Ratio	5	3	2	4	1		
	15 Alpha	4	2	3	5	1		
	16 Jensen's Alpha	5	1	3	4	2		
Key 1 = highest rank 5 = lowest rank								

We can draw a number of general conclusions from these observations:

- Fund rankings obtained using RAPM do not necessarily have to agree. In fact, they are at times conflicting and seemingly inconclusive. Therefore, RAPM are not magic-box solutions but rather specialized tools which should be applied with good judgement, in context and for a specific purpose.
- The observation time-frame(s) chosen and the method used to measure returns have a profound bearing on RAPM-based analysis. The timeframe should be long (monthly returns over 5-10 years) and diverse (3, 5 and 10 year trailing periods) enough to present a meaningful and well-rounded picture of the fund's performance over time and disparate market conditions (e.g., bull and bear markets as well as shock events).
- Each risk metric is a measure of variability around a certain mean value, each in a different context: Volatility is the dispersion of returns; tracking

error is the dispersion of excess returns; and beta is the dispersion of returns versus the benchmark. Consequently, each measure of risk has a specific application and significance and, if used in isolation, can yield partial (and possibly misleading) information about potential investment loss.

- Volatility is a measure of systematic and non-systematic risk whereas beta only captures the former. A fund can have high volatility but low beta, such as Fund 5. In this case, the Sharpe ratio is suppressed but the Treynor Ratio is improved. Consequently, Fund 5 ranks 1st on Treynor Ratio but only 3rd on Sharpe Ratio. The position is reversed for Fund 2, which has a low volatility but high beta. As a result, it ranks 1st on Sharpe Ratio and 3rd on Treynor Ratio.
- Good funds will generally rank high on most, if not all, RAPM metrics (Funds 2 & 5). Conversely, poor funds will generally rank low on most, if not all, RAPM metrics (Funds 1 & 4).
- Returns that are not risk-adjusted have little value in performance evaluation. For example, Fund 4 has a positive excess return of 2% yet a negative alpha and Jensen's alpha.
- Information Ratio is a strong indicator of manager skill (e.g., Funds 2 and 5). A score of ≥ 0.5 generally indicates a skilful manager, but this must be put to a more rigorous test for confirmation. In addition, when comparing two or more funds, simply comparing Information Ratios could be misleading. For example, while Fund 2 has an impressive excess return of 10%, twice that of Fund 5, it has a very high tracking error of 20%, almost 3 times that of Fund 5. Although this is partially reflected in Fund 2's lower IR value (0.50 versus 0.71), the ratio is still high enough to potentially consider the manager skilful. However, it would be prudent to scrutinize the Fund's high tracking error to observe its peaks and valleys over time before selecting it over Fund 5. It is reasonable to expect that historically the fund's IR might have been erratic and at times alarmingly lower. (See Appendix VI for a detailed discussion on IR).
- Each fund's Sharpe Ratio can be compared directly to that of the benchmark (row 6a). Funds which under-perform the benchmark will have a comparative ratio (row 12a) of <1 , such as Funds 1 & 4. Funds 2, 3 & 4 have outperformed the benchmark (comparative ratio >1) with Fund 2 outshining the rest.

6. Conclusions & Recommendations

6. Conclusions & Recommendations

The DC industry is undergoing a fundamental transformation which is creating unique but interrelated challenges for members, sponsors and regulators alike. These challenges are complex, interlinked and multi-faceted. Their solutions must therefore be coordinated, multi-lateral and multi-disciplinary with plan members at their core. Each stakeholder must take appropriate steps to adapt successfully to this new and evolving environment, ensuring that the solutions provided and pursued are effective and long-term.

We propose a three-pronged approach for sponsors for resolving these issues:

- Plan enhancement and efficiency centred on a well-designed fund menu complemented with sophisticated tools, enabling members to create customized, efficient and well-maintained portfolios for their retirement
- A clearly-defined member segmentation and product customization strategy
- Empowerment of members through investment education and training, encouraging them to engage proactively with their plan and take charge of their retirement planning

The lack of member investment knowledge is the undercurrent of most of the challenges facing sponsors in their goal of encouraging employees to engage with their plan and better prepare for retirement. Employees themselves are also pointing to this gap with 18% saying that financial education would encourage them to save for retirement. This is compelling evidence that investment education is not a luxury, but a need. On this point, we recommend dialogue and collaboration with policy-makers as a catalyst for providing access to effective educational tools that can improve member investment understanding and decision making. Regulators should work closely with sponsors to inspire and motivate employee along the path to retirement readiness by mandating the provision of investment education. Implementing these improvements constitutes a timely and prudent marketing exercise for sponsors at a time when DC participants are increasingly calling for more than just the typical bare-bone features in a plan. We offer the following recommendations for each stakeholder:

6.1. Plan Members

Plan members must take personal responsibility in accepting a proactive role in their retirement planning. This means acknowledging that the baton has effectively been passed on to them by their patrons who have shifted down a gear from the “we will do it for you” modus operandi of yesteryear to a “you do it yourself” paradigm of today. This spells the need for greater autonomy in the form of self-reliance and self-sufficiency. It also underscored the imperative that members should become more conversant with – if not competent in – the basic principles of investing. This can be accomplished through diligent self-education and the practical application of such acquired knowledge to personal retirement planning. What better arena for members to achieve both than the plan platform and resources provided to them by their sponsors?

6.2. Plan Sponsors

For sponsors, it is time to accept that their members are as much “clients” as employees and begin to view their DC plan as a commercial and marketing vehicle - in other words, as a “product”. At many levels, this product is wanting: Poorly-designed, sub-par in content, standardized and uninspiring, it distances plan members rather than inspires them to engage with the task of retirement planning. To redress these critical shortfalls, sponsors must strive to introduce dynamic, customizable solutions while at the same time segmenting their clients, acknowledging that one-size does not fit all. These solutions should include a well-designed menu of quality funds, a wide range of tools for risk profiling, portfolio building, re-balancing and modelling, as well as customizable educational resources delivered through regular seminars, workshops and meetings. These facilities should enable participants to design fit-for-purpose portfolios which are customized, efficient and well-maintained.

In addition, sponsors should upscale their fund governance, employing institutional-grade practices which are encoded in formal and up-to-date Manager Due Diligence and Manager Continuation Policies. These practices will guide sponsors to select and retain only those fund managers who demonstrate quantifiable investment skill – a rare breed indeed. If this critical function is farmed out to trustees or outside investment consultants, then it is imperative that

sponsors satisfy themselves that the relationship is not compromised by any conflict of interest. More often than not, however, the investment consultant is also the fund company as well in which case the impartiality of the fund selection is at best dubious, especially if the entire range, or at least a significant portion thereof, is also provided by that fund house. For fiduciary and practical reasons discussed in the proceedings of this article, sponsors must place the complete independence and impartiality of fund selection at the core of their governance process. Table 16 is a sample Quality Control Questionnaire to assist sponsors in their self-assessment with respect to these key issues of fund governance. The questions, which are by no means exhaustive, have been divided into four categories: Questions sponsors should ask themselves; their fund managers; their investment consultants; and their trustees. We would expect sponsors who have a well designed, maintained and governed plan to be able to answer the vast majority – if not all – of these questions in the affirmative.

Table 16: Sponsor Self-assessment Quality Control Questionnaire				
	Questions about...	What to ask	Yes	No
1	Yourself	Do you have a formal and up-to-date Investment Policy Statement?		
2		Do you have a formal and up-to-date fund selection Due Diligence Policy?		
3		Do you have a formal and up-to-date Manager Continuation Policy?		
4		Do you have a member segmentation and product customization strategy?		
5		Do you provide a well-designed funds menu?		
6		Do you provide a range of investment tools?		
7		Do these tools include a risk profiler, portfolio builder, modeller and re-balancer?		
8		Are your members able to create customized, efficient and well-maintained portfolios?		
9		Do you provide a range of investment educational resources?		
10		Are these educational resources delivered through seminar, workshops and meetings?		
11	Your active fund manager(s)	Are your fund managers value for money?		
12		Do you periodically re-negotiate their fees?		
13		Do you have a formal communication protocol, especially for fund performance?		
14		Do you monitor their performance on a regular basis?		
15		Do they frequently out-perform their assigned benchmark?		
16	Your investment consultant	Do you employ managers from multiple fund companies?		
17		Is the frequency of your manager turnover optimal?		
18		Is your consultant truly "independent"?		
19		Is your consultant also a fund company?		
20		Have you ensured that there is no potential conflict of interest if the two are the same?		
21	Your trustee	Does your fund company also recommend funds to you?		
22		If so, is the fund performance review according to your MCP?		
23		Do you have procedures in place to evaluate the performance of your trustee(s)?		
24		Are your trustee fees in line with industry standards?		
25		Do you periodically re-negotiate these fees?		

6.3. Regulators

The regulators have an important role to play in defining the overall responsibilities of each of the stakeholders and for placing necessary emphasis when, where and how it is most required. However, as bureaucratic bodies they

have at times shown themselves to be out of synch with the rapidity of the transformations which are driving the DC industry – behind the curve, so to speak. At other times they have tended to be myopic, focusing their attentions unevenly on the sponsors and trustees as if they were still the paternal guardians of plan members. This focus must shift, at least to an even keel, to the members as well, placing a greater burden of responsibility on their shoulders for their own welfare.

Regulators' initiatives must accordingly echo and re-enforce research findings that DC plan members are deeply under-nourished when it comes to investment education. While we do not propose mandatory education for members along the lines already required of trustees, we do recommend that regulators at least mandate the provision of investment education by sponsors. This effort should strive not to just educate but to empower plan members in becoming well-informed, self-reliant investors capable of complex decision-making and of taking active control of their future financial welfare.

In addition, regulators must engage with plan members more fully to gain a realistic understanding of their needs and requirements before proposing mandates or initiatives that do not necessarily reflect the realities on the ground. For instance, presenting members as a homogenous, featureless group portrayed by the proverbial “Max” clearly paints a very simplistic picture of what is otherwise a diverse and eclectic cross section of society with different needs and aspirations to match. Closer consultation with industry practitioners and independent researchers will ensure that there is no such dis-engage between perception and reality. Regulators should therefore place themselves in the driving seat of reform and instil a greater sense of urgency for retirement planning, but always keep in mind the tenet that the course and direction of the journey must be set by the passengers - the plan members – and the dictates of change.

Appendices

APPENDIX I

Constructing an Index of Risk Aversion

An Index of Risk Aversion (IRA) is a numerical expression of investor attitude toward the uncertainty of investment outcome. In other words, it quantifies the investor's perceived trade-off between risk and return for that investment. By convention, IRA is expressed on a scale of 1 through 7, 1 being the lowest risk aversion (highest risk tolerance) and 7 the highest (lowest risk tolerance).

The determination of an IRA score is a subjective exercise, as we might expect from the assessment of any behavioral issue. One way of “measuring” IRA is to present the investor with a hypothetical double-or-half lottery game, the outcome of which is decided by the flip of a fair coin, and ask the following question: “What proportion, denoted by ‘x’, of your total wealth are you prepared to put in this speculation?” Beginning with wealth (W), a good outcome will result in a gain of $2(xW)$ and a bad outcome a loss of $\frac{1}{2}(xW)$. If the investor specifies $x=20\%$, for instance, then his coefficient of relative risk tolerance is 0.2; IRA is the inverse of this fraction, thus $1/0.2=5$.

While this is a somewhat simplified example, the industry methodology for assessing an investor's risk profile is essentially the same, albeit with more elaborate permutations. In practice, advisors routinely evaluate an investor's risk aversion through qualitative interviews combined with quantitative questionnaires (of varying quality) which pit risky prospects against riskless ones to “test” each candidate's aptitude for risk under various scenarios and timeframes. This psychological profiling is often quite accurate and yields a reasonably reliable picture of an investor's attitude toward risk. However, there is no standardization and the results of one questionnaire are not necessarily the same as another's. It is therefore essential for advisors to “supplement” such questionnaires by engaging with investors to form a complete picture of their financial circumstances and long-term investment goals.

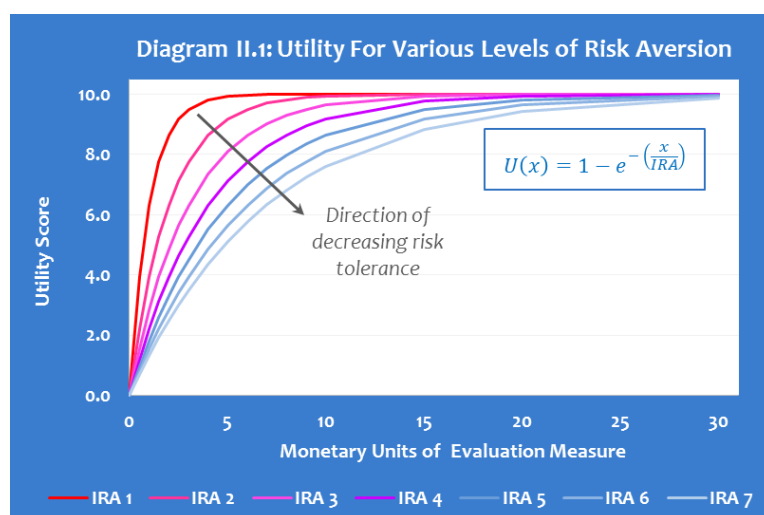
APPENDIX II

Utility

Investors show different preferences for the same investment depending on the subjective monetary value or “usefulness” they assign to its outcome. In the parlance of behavioral finance, this usefulness is referred to as the **utility** of that investment for that investor. Thus utility poses the question: “What is this investment worth to me?” or, alternatively, “How does it rank among a set of investment opportunities?” The answers are framed in terms of how an investor perceives the level of risk associated with that investment. Therefore utility can be viewed as a risk-adjusted measure of value: The higher the utility of an investment, the more preferable it is.

For a risk-averse investor, utility can be expressed as an exponential

function such as $U(x) = 1 - e^{-x}$ (Diagram II.1). This function has two characteristics: It is upward sloping ($U'(x) > 0$), which reflects the notion that “more is better”, and it is concave ($U''(x) < 0$) because as wealth increases, a risk-averse investor assigns less utility to an additional unit of gain. Thus increasing wealth by €1 from an absolute base of €1 (100% increase) has a much greater **marginal utility** than increasing wealth by the same amount but from a base of €100,000 (0.001% increase).



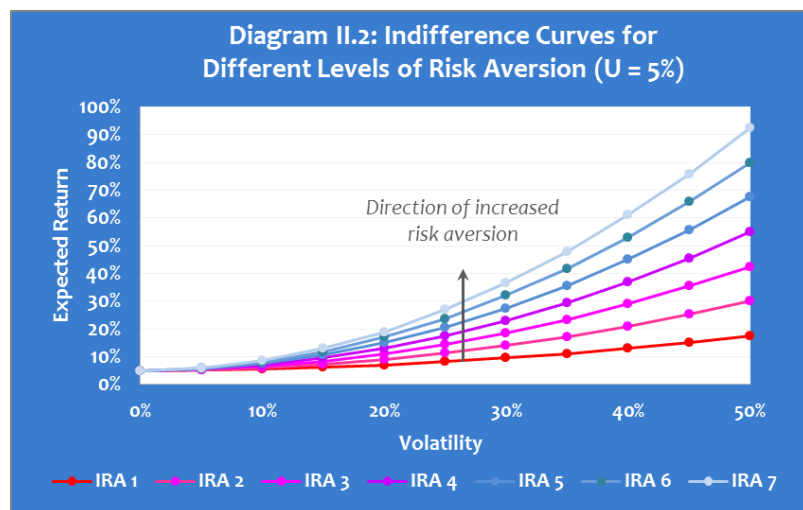
To incorporate investor risk preferences into this model, the exponential utility function can be modified to $U(x) = 1 - e^{-x/IRA}$, where IRA is the index of risk aversion, a positive constant. Diagram II.1 shows the utility function for seven IRAs with progressively greater concavity. An investor with an IRA = 1 (least risk averse) will assign a much higher utility to a given level of gain than an investor with an IRA = 7 (most risk averse).

Utility can be calculated in terms of risk and return parameters. For a portfolio with a mean return of E_p and volatility of σ_p , it can be expressed as:

$$U_p = E_r - (\frac{1}{2} * IRA * \sigma_p^2)$$

The formula states that in order to arrive at a utility value for investment U_p for a given investor, that investment's expected return (E_r) must be adjusted by the deduction of a risk penalty equal to $IRA * \sigma_p^2$ where σ_p is the volatility of the investment and IRA is the investor's index of risk aversion.

In this context, utility plots an upward, convex curve known as an **indifference curve**. As the name implies, utility along such a curve is constant. Diagram II.2 shows seven indifference curves, all corresponding to a utility of 5.0%, assumed



to be the risk-free rate (volatility = 0%). The diagram illustrates that an investor with a low risk aversion ($IRA = 1$) will be indifferent between a risk-free investment offering 5.0% and one with a return of 9.5% but volatility of 30%: Both investments have a utility of 5.0% for this investor. On the other hand, a very risk averse investor ($IRA = 7$) will be indifferent between the risk-free investment and one with a return of 36.5% and the same level of volatility (30%). Once again, both investments have a utility of 5.0%. Therefore, the risk-averse investor applies a much larger “penalty” to the potential outcome of an investment compared to the less risk-averse investor, who is satisfied with a lower return for a given level of risk.

APPENDIX III

The Active v Passive Debate

When selecting funds, sponsors have to address one contentious question: “Is there value in active management or are investors better off using passive funds, which deliver the performance of an index at a fraction of the cost?” This consideration is at the heart of the active versus passive debate, one which is ultimately about the validity of the efficient market hypothesis (EMH).

The argument is as follows: If the financial markets are efficient, then active managers cannot be expected to produce benchmark outperformance, net of fees, except by random chance. If they are semi-efficient (as they seemingly are) then skilled managers **might** be able to produce statistically significant, net benchmark outperformance, albeit inconsistently.

There is no clear cut answer to - or unanimous view of - this perplexing question; if there were, then one of these strategies (and its related products) would long have been obsolete. Judging by the proliferation of both active and passive funds, it is clear that each camp has its ardent supporters and both are here to stay.

The fund industry has responded to the active camp’s perpetual search for “alpha” by a profusion of products, the vast majority of which are performance also-rans. For sponsors and their advisors who prefer active managers, the challenge is to identify and select “quality” funds, a difficult task made the more daunting by their sheer volume and variety. Thankfully, however, the path is illuminated with occasional brilliance: The elite, “hot hands” fund managers who seem to possess the unique skill-set to “read” the markets and eke out superior performances, succeeding where others fail. The odds for finding them, however, are not encouraging: Research indicates that this group constitutes at best 1.5% of a vast and expanding universe. Value for money fund managers are a rare breed indeed, but certainly not extinct. The conundrum is in finding them. Sponsors should ask tough questions of their active fund managers and justify their selection (and retention) to their members.

APPENDIX IV

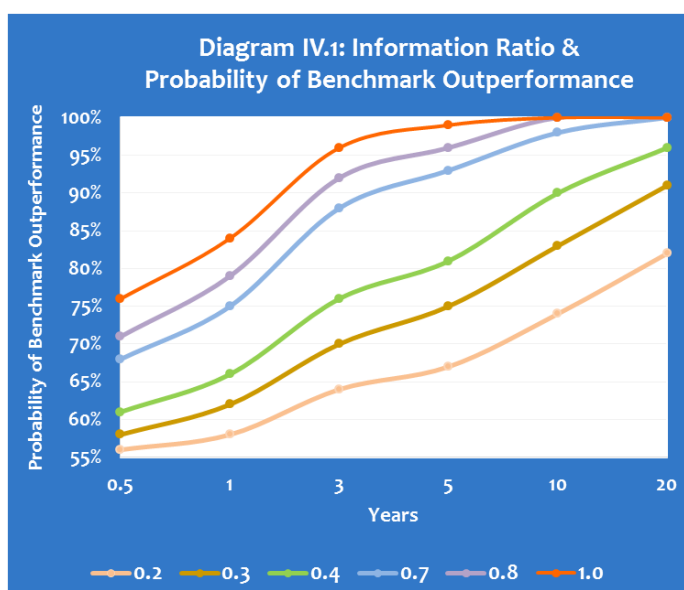
Putting Managers under the Microscope with Information Ratio

Information Ratio is a risk-adjusted return measure in which the nominator is annualized excess return versus the benchmark, also known as active return²⁹, and the denominator is the volatility of that excess return, also known as active risk or tracking error (TE).

$$IR = \frac{\text{Active return}}{\text{Tracking error}}$$

The success (or otherwise) of a manager's active bets against the benchmark are captured by the value of the active return: Net good calls will result in a positive value; net bad calls in a negative one (and therefore a negative IR). On the other hand, TE is affected by any fundamental difference between the fund and the benchmark, such as the manager's security

selection, asset allocation strategies (style) and market timing strategies; the fund's management fees; the fund's beta; the inflow and outflow of cash into the fund, which may force the fund manager to rebalance periodically; and the volatility of the benchmark itself.



IR is a powerful diagnostic tool for evaluating an active fund manager's skill and the consistency of that skill. In this sense, it has predictive value³⁰ as illustrated in Diagram IV.1 which plots the probability of benchmark outperformance for various levels of IR. We can draw a number of general conclusions from this data:

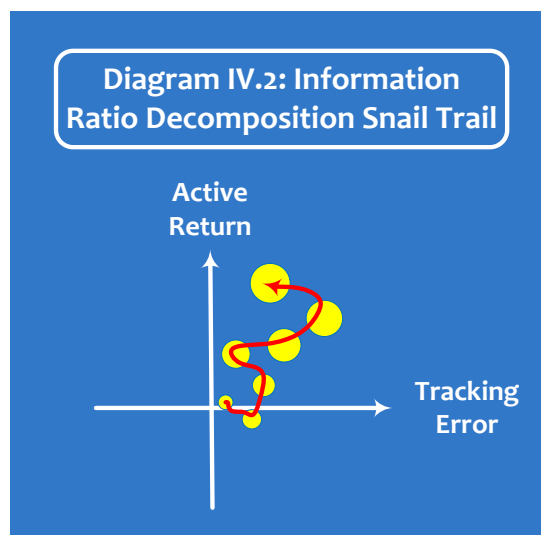
- A higher IR corresponds to a higher probability of benchmark outperformance. Skill pays!
- Probability of outperformance at a given level of skill increases with time (volatility of return is dampened). In other words, time can partially compensate for poor performance as unskilled managers also “ride the tide”. However, the probability of underperformance remains relatively high for an unskilled manager even over an extended time horizon while for skilled managers it approaches zero. This is an important differentiator.
- An unskilled manager has an approximately even chance of underperforming his benchmark in a 1-year timeframe. In other words, in the short-run, his performance can almost be replicated by the toss of a coin. His odds improve only slightly over 1-5 years.
- A manager with an $IR = 0.4$ has a less than 1-in-4 chance of underperforming his benchmark during a 3-year timeframe. This probability falls to 10% for a 10-year period, and <5% for a 20-year period.
- A highly skilled manager ($IR \geq 0.7$) has a very low probability of underperforming his benchmark even over shorter investment time horizons, e.g. 3 or 5 years (12% and 7%, respectively). The probability is negligible for periods over 10 years and zero for ≥ 20 years.

A skilled manager will typically have $IR \geq 0.5$, which will remain stable over time. However, the components of IR will fluctuate even for the best of fund managers. Therefore, performance monitoring should take into account how excess return and tracking error have changed over time. Decomposing IR in this fashion provides a window into a fund’s health and furnishes many valuable insights into the manager’s decisions and their consequences. As long as the excess return/tracking error permutations are favourable (e.g., flat excess return combined with a lower TE), IR remains stable and the prognosis for the fund is satisfactory or better, as shown in Table

Table IV.1: IR Decomposition as a Barometer of Fund Health				
		Tracking Error		
		Down	Flat	Up
Excess Return	Up	very good	good	satisfactory
	Flat	good	satisfactory	deteriorating
	Down	satisfactory	deteriorating	problematic

IV.1. When the combinations are unfavourable (e.g., lower excess return and flat TE), the prognosis is poor, indicating that the manager’s decision-making process might have been compromised and/or is deteriorating. If both active return and TE have degraded simultaneously (red box in Table IV.1), it is very likely that a

fundamental negative change has occurred with the fund manager and his team. The most practical way to observe these changes is by means of a snail trail “history” which traces the movements of each component over time as illustrated for a fictitious fund in Diagram IV.2. The red arrow marks the movements of active return and tracking error readings over 7 periods, the latest represented by the largest circle. This fund manager demonstrates a turbulent track record in which active return has been erratic (and negative in period 2) and tracking error has generally increased, with the exception of period 7 in which active return has increased while tracking error has decreased.



An alternative way of assessing IR is through a more theoretical approach referred to as the Fundamental Law of Active Management (FLOAM). This law states that a manager’s success depends on two factors: His information coefficient (skill) and the number of active investment decisions (or trades) he is able to make in a given period (breadth). Mathematically, this relationship is expressed as:

$$IR \approx \text{Information Coefficient} \times \sqrt{\text{Breadth}}$$

In this context, skill is the effectiveness of a manager’s foresight, measured as the correlation between his forecasted returns and actual returns: The higher that correlation, the more skilled the manager and the higher his Information Ratio. For very skilled managers this correlation is in the range of 0.55-0.65.

Breadth, the second component, refers to the number of independent trades a manager can make and is a function of the universe of selections available to him. The greater this opportunity set, the better are the chances that he can display his skill. In other words, a manager who is right with his forecasts 60% of the time has a better chance of sustaining that level if he has 100 stocks to choose from rather than 10. This is in part due to the law of averages: If the manager can “throw the

dice” only 10 times, it is less likely that he will be right 6 times than if he can throw it 100 times, in which case he is more likely to reach his natural level of 60%.

In practice, if a manager only has access to four traditional asset classes and is confined to strategic asset allocation, then his breadth is $\sqrt{4} = 2$. On the other hand, for managers who are able to use tactical asset allocation strategies, breadth can be much wider - including global markets and diverse asset classes such as currencies, commodities, options and futures - inflating it to as much as 30 or 40 (for the formula $\sqrt{30} = 5.5$ and $\sqrt{40} = 6.3$). The greater the breadth, the more likely it is that a manager can achieve his optimal effectiveness. However, there is a flip side to increased breadth in that beyond a certain point, it leads to a compression of information coefficient. This is because the manager will begin with his best but finite bets and as these are used up, will gradually have to use less attractive (and less productive) trades.

We can add a second constraining component to this relationship, that of efficiency, which is the proportion of the manager’s ideas that are ultimately incorporated into the fund. This constraint is imposed by the fund’s objective(s) and codified in the prospectus. A typical example for an equity fund would be the long-only constraint which prohibits the manager from taking short positions, therefore limiting his efficiency. For such a fund, efficiency would be in the range of 30%-40%.

$$IR \approx \text{Information Coefficient} \times \sqrt{\text{Breadth}} \times \text{Efficiency}$$

Based on this modified version of FLOAM, an average equity manager with Information Coefficient ≈ 0.5 , breadth ≈ 4 and efficiency of 30% will have $IR \approx 0.5 \times \sqrt{4} \times 0.3 = 0.3$.

APPENDIX V

The Irish Perspective

Total pension assets¹:	€108bn
Percent of GDP²:	54
Percent of global market²:	0.40
CAGR¹:	5.6%
Number of DC Schemes¹:	60,000
Total DC Membership¹:	240,000
DB/DC asset split¹:	62.5%/37.5%
Active/passive split¹:	68.5%/31.5%
Retirement readiness³:	Poor

¹IAPF

²Tower Watson

³Mercer

Notes & References

Notes & References

1. In the decade ending 2014, DC's share in the seven major pension markets increased from 39% to 47%, a net gain of 8%. This gain is reflective of the asymmetrical DC/DB annual growth rates over the period of 7.0% and 4.3%, respectively. Source: Tower Watson, "Global Pensions Asset Study 2015"
2. Investanalitix calculations based on Tower Watson data in report referenced above.
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6. European Insurance and Occupational Pensions Authority, 2013. "Good practices on information provision for DC schemes. Enabling occupational DC scheme members to plan for retirement", EIOPA-BoS-13/010, 24.
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13. Hewitt Ennisknupp, "Improving DC Plan Investment Governance: A Call to Action", 2013. For the "Under 30" cohort, average annualized underperformance versus an efficient portfolio was 0.275%.
14. Cumulative portfolio underperformance versus an efficient portfolio is calculated using the future value of annuity formula below, where i=amount of annual underperformance (as estimated by the report in reference 13) and n=number of years to retirement. All annual payments are assumed to have been made at the end of each year. Other assumptions are specified in the text.

$$\left[\frac{(1+i)^n - 1}{i} \right] - 1$$

15. Benartzi, S. and Thaler, R., 2001. "How Much is Investor Autonomy Worth?" University of California-Los Angeles Working Paper.
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