



## **ALM AND INVESTMENT STRATEGY**

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### ALM and Investment Strategy<sup>1</sup>

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#### ABSTRACT

The risk-return profile of the strategic asset allocation of pension funds must seamlessly connect with the ambition and the risk profile of the pension deal. This puts great pressure on pension trustees and investors, who additionally have to take into account steering at nominal or real coverage ratios, the short and the long term, local regulatory frameworks as well as the International Financial Reporting Standards (IFRS). The authors propose a holistic approach, with the long-term, stakeholder-driven strategic asset allocation dominating, yet at the same time adapted to short-term solvency constraints and current views on the financial markets.

Keywords: Asset and Liability Management, holistic approach, investment policy, scenario analysis, pension funds.

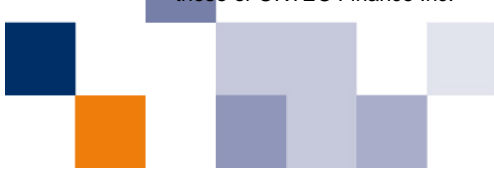
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# 1 Introduction

What is, in essence, the role of the investment policy at a pension fund? The board of a pension fund formulates an ambition regarding the desired level of the pensions. The fund could run the pension plan by charging the sponsor with the actuarial cost of the pension product, and invest these contributions in the so-called liability-hedging portfolio. If abstaining from actuarial risk, including longevity, the plan would most certainly have a funded ratio of 100%. However, the cost of such a pension system would in almost all cases be prohibitively high. It is therefore clear that funds must take certain investment risk with the available capital. These risks are carried by the current and future stakeholders of the plan in three possible ways:

- the premium risk for the sponsor, in case the sponsor remains (partly) responsible for funding shortfalls. Note that the premium risk impacts both the cash flows of the sponsoring company as well as the profit and loss account and balance sheet (IFRS);
- the indexation risk, temporarily postponing the adjustments of the pensions for increasing cost-of-living, and pension risk, where the level of the pensions is reduced in order to become solvent again;
- the risk of funding shortfalls, by assessing to what extent trustees deem it responsible to postpone pension risks by allowing for temporary underfunding, and whether the decisions they make can actually pass the scrutiny of modern-day pension regulation (e.g., Dutch FTK, IFRS).

The total amount of risk that all stakeholders combined are willing and legally able to bear should, in the end, precisely match the extent to which pension investors play the financial markets in order to generate the necessary returns to fulfill the formulated pension ambition. We therefore submit the following basic principle: that investment policy should never be a goal in itself, but only a means to accomplish the larger objectives in the most efficient way possible, while simultaneously respecting the risk limits of all the stakeholders and regulators involved.

The practical implementation of this basic principle increasingly confronts policy makers and managers with several complex issues. Our main concern here is the manner in which the optimal strategic asset mix is determined in an Asset Liability Management (ALM) context, and if and how one can deviate from this mix whenever either the short-term risks are too high, or the financial markets are considered significantly under- or overvalued. Because managing the nominal funded ratio ( $\leftrightarrow$  frequently used by the legal framework) demands a substantially different investment policy than aiming for the real funded ratio ( $\leftrightarrow$  pension ambition), this issue – one that causes major headaches all around – will receive some much-needed attention here as well.

We will furthermore examine the relationship between ALM and the increasingly popular Liability-Driven Investment (LDI). The past decades have witnessed the Dutch as frontrunners in ALM and in establishing an investment policy based on pension criteria, as opposed to the so-called “asset only” approach which focuses merely on returns, without considering the potential consequences for the stakeholders involved. It is therefore no coincidence that pension expertise and ALM are often being mentioned as two of the spearheads of the ‘Holland Financial Center’. Since the LDI approach is essentially the first substantial endeavour of highly-influential international asset managers in this field, it is critically important to clearly distinguish the LDI approach from ALM here.

## 2 Pension deal, investment policy and ALM: basic principles

Risk is undoubtedly the main, if not the only source of return. Consequently, one of the most important strategic decisions made by pension funds is to determine the amount of investment risk taken. Two simple observations underscore the crucial importance of this decision: first, as a rule of thumb we hold that 1% extra return is equal to 30% higher pensions or 30% lower premiums, thereby demonstrating the crucial role of investment risk in realizing the formulated pension ambitions. However, based on the available historical data, it should be stressed that in any given year a global stock exchange index faces a 2.5% chance of decreasing more than 30% in value and, moreover, that such weak stock markets can persist for an prolonged time, as evidenced by the crisis in Japan during the 1990s and the very slow recovery after the Crash of 1929. It is therefore paramount to determine the investment risk as high as possible, yet always on the precondition that if this risk actually materializes, it can still be safely absorbed according to previously-agreed upon and clearly-communicated ways.

How then is this crucial decision regarding the amount of investment risk being executed in practice? Before we describe how this issue has been tackled in the Netherlands over the past quarter of a century or so, namely with the help of ALM studies, we will first demonstrate the more frequently-used, yet in our opinion rather faulty approach.

In many other countries the following approach is the more common one. Suppose a pension fund desires an  $x$  % investment return. Consequently, based on the expected returns of the various asset classes, a strategic asset allocation is determined that seeks to realize this required return. Think here in particular of companies reporting under the IFRS, since the expected returns are deducted from their pension cost (see the IFRS box in section 3.2). The higher the % of risky assets in the strategic investment mix, the greater the reported future returns will be. This is often the only explanation for the existence of strategic mixes consisting of 70% to 80% risky assets that we have seen – and at times still see – particularly in the United Kingdom and the United States. In this approach the required return is the guiding principle, and the accompanying risk is often taken for granted. As a result, many of these funds have been confronted by large funding shortfalls at the beginning of the 21<sup>st</sup> century and during the recent credit crisis of 2008, subsequently leading to their closing, and thereby to a situation in which many people, almost entirely unprepared, have to survive on a dramatically lowered pension for the remainder of their lives.

*“In short, institutional investors have generally failed to integrate portfolio investment policy in the larger context of the circumstances of the bearer of investment risk. Why? Why have ostensibly sophisticated and well advised institutions not heeded the first lesson of portfolio theory and integrated their risk decisions?”*

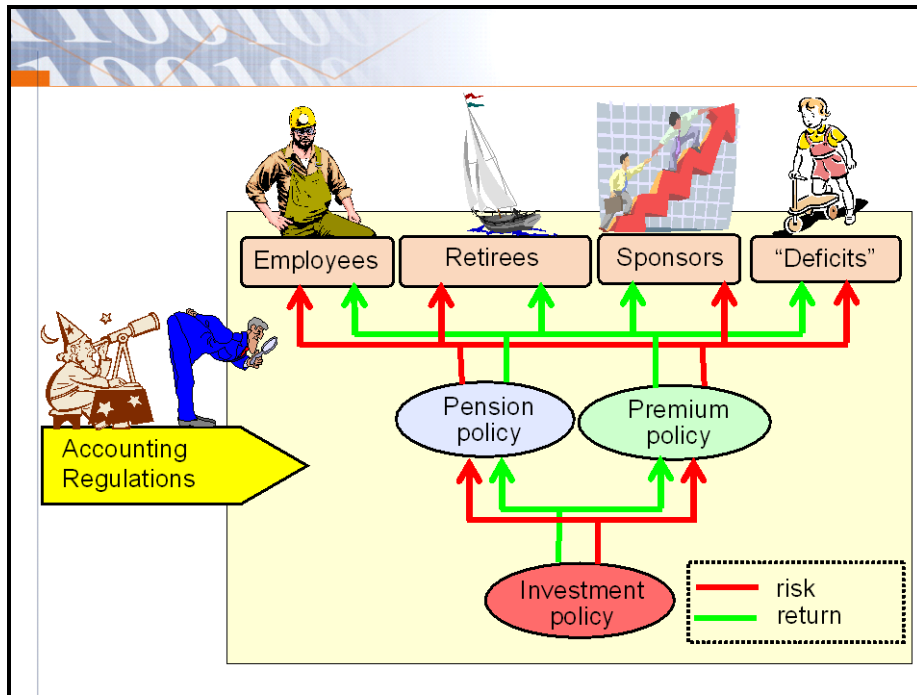
Richard Ennis, in: *Financial Analysts Journal* (August 2007).

Evidently, this approach is highly irresponsible. A first step into the right direction is the recent emergence of Liability-Driven Investing. But the common LDI approach is focused too squarely on the existing pension liabilities, since it is based on the benefit payments resulting from those current liabilities, making it therefore *de facto* a so-called liquidation approach. LDI does not take into account the acquisition of new pension rights, nor the other risk-reducing effects of premium- and indexation policies. The possibilities for absorbing the risks are therefore underestimated, with obvious consequences for the strategic mixes and protection constructions that appear to be optimal in LDI.

Professional ALM chooses an integrated holistic approach, meaning it seeks to bring into line the ambitions and the corresponding risks for all stakeholders involved. The result is a complete and fair pension deal, in which all parties involved know exactly which ambition is pursued, and at what risks to themselves. In this integral approach the investment policy is a serving instrument that ensures that the ambitions of the pension deal are effectively realized, while simultaneously respecting the risk limits of the stakeholders. Thus, for pension investors following this approach the investment risks and returns are never the guiding principles. Instead, it is infinitely more important how risk and return work, through pension and premium policy, toward the ambitions of the pension contract. After all, the pension and premium policy are the instruments that record how risks and returns are being absorbed and distributed by the various parties involved.

In pension investing there should never be more risk exposure than the pension deal allows, but also nothing less, because in the latter case the return will automatically be lower than expected, and as a result the ambition will fail as well. The first basic principle of investment policy for pension funds therefore is that the amount of investment risk corresponds exactly with the amount of short- and long-term risk that the various stakeholders have agreed upon, and are willing, able and legally allowed to take. An important goal of ALM studies is to support managers in shaping the pension deal and the agreements regarding risk distribution and the allocation of the assets that spring from it. Furthermore, ALM studies serve as a bridge to asset managers, enabling them to actually execute the investment policy conform the pension deal.

Figure 2.1: Holistic approach of pension deal



## 3 ALM studies

### 3.1 Objectives

ALM studies have two kinds of objectives. First, they lend support and advice in determining the pension deal, including the consequences it brings for the investment policy. Second, they can – and should – contribute greatly to insight, transparency and responsibility to the whole process. The following case will explain this in more detail.

### 3.2 Case study: the problem of interest rate and inflation management.

In recent years both country-specific pension regulations and the International Financial Reporting Standards (IFRS) require that pension liabilities are assessed at market value. The result is that if the interest rate declines with 1%, the nominal pension liabilities increase with 15 to 20%, and the same applies to real pension liabilities. Obviously, this causes gigantic problems for pension funds. And although there are products in the market that seek to eliminate the impact of market valuation and thus provide protection against declining interest rates, these do not come cheap and cause a variety of new problems that will be addressed here.

The Dutch regulatory framework FTK is at present defined in nominal terms. But nominal immunization can damage the core ambition of pension funds to offer real value protection. And furthermore note that the opposite effect a nominal coverage product has on a real coverage ratio also applies to other investment products, such as index-linked bonds.

Secondly, it can be submitted that a coverage product which yields €1 billion in case the interest rate declines, carries opportunity costs of similar proportions if the interest rate does in fact increase at an identical speed. Pension funds are continuously confronted with this dilemma: they apply risk management by covering for interest rate declines or inflation, yet, in case the markets develop in an opposite direction, this policy severely damages the long-term ambition.

A 1% change of the interest rate or inflation effectively puts roughly 15% to 20% of the liabilities at stake. It is therefore not only important that ALM studies give sound advice, but also provide the pension managers with sufficient insight so they can take responsibility for the decisions made based on sensible arguments. Furthermore, it goes without saying that especially in the financial world a right decision does not always lead to the desired result. A concise example of this concerns pension funds that have sought protection for a 10-year interest rate at barely 3%, and subsequently missed out on the upside when the interest rates suddenly increased. Funds that had already lost most of their risk budget may very well have taken the correct decision at the time, yet in hindsight they are naturally being heavily – and somewhat unfairly – criticized.

It is therefore of increasing importance that pension managers are transparent in their decision-making, and take responsibility for the motivations that lay behind it. This is another part of the entire investment process where ALM can be of great assistance.

## 4 Approach: Scenario Analysis

In order to realize the aforementioned objectives of a pension fund, ALM studies utilize the technique of scenario analysis. Scenarios are future trajectories mapping the external insecurities that managers must take into account in their policy determination and evaluation. They concern the usual suspects: inflation, interest rates, currency, the returns of the various investment categories and styles (such as hedge funds), and the development of instruments deduced from these, such as swaps and options. ALM studies calculate, with the use of a model of the pension fund, for every year and each scenario, what the consequences are of the policy intentions for all stakeholders involved. This is done by taking into account the relevant characteristics of all individual participants, namely the dynamics regarding long-life, career and disability etc., and how these characteristics are translated, given the pension scheme, into premiums, indexations and coverage ratios. Like Confucius, who famously stated that one graph tells more than a thousand words, scenario analysis is coupled with graphic displays, in order to bring faster and better insight. To identify the investment policy that makes optimal use of the risk budgets, scenario analysis is also aided by optimization techniques.

There are several publications that deal with the technique of scenario analysis applied in the ALM context. Here we will briefly discuss the concepts that are of special importance to the managers.

“Garbage in, garbage out”, it is often said of models. While such a statement may have some truth to it, it simultaneously neglects the fact that all science is based on data collection, with the scholar simply attempting to make sense of, and interpret the available data. The same goes for the use of data in generating scenarios. An interesting example here is whether past stock returns should be modelled in scenarios or not. Adherents of the random walk hypothesis would consider such an exercise futile, whereas others believe stock returns of the past hold certain valuable information. While both views can be defended at length, they have significantly different consequences for the optimal strategic asset allocation. What is clear is that managers can only truly judge the results of their policy choices if they possess sufficient insight in the data and assumptions used to generate the scenarios. In practice, this aspect of ALM studies should receive much more attention than is currently the norm.

In addition, a discussion of ALM should not fail to mention the recent emergence of so-called risk-neutral scenarios. These are scenarios that can be used to calculate the price of options in a correct manner. The reason behind this emergence is the growing interest in assessing the value of the solidarity that various stakeholders in the pension deal are showing each other, whether intended or not. One should especially consider the solidarity between young and old here. As the recent dissertation of Theo Kocken, “Curious Contracts”, describes in detail, these forms of solidarity can be viewed as embedded options (similar to an option to buy or sell a stock at a certain time for a specific price), and ALM scenarios must adhere to risk neutrality in order to calculate the value of these options in the correct manner.

It is extremely important for managers to realize here that revenue-maximizing effects are entirely lost in this valuation of solidarity. The expected return of the asset mix therefore has no impact at all on this calculated value of solidarity. This seems odd, but the clear price of an option on a certain stock is also independent of the expected return of that stock.

To underline why and how scenario analysis is successful in realizing the objectives of ALM studies, we will first give a few quotations that specifically apply to the use of scenario analysis in ALM, and then demonstrate a concrete example based on the fictional pension fund Hollandia. Besides the use

of ALM in determining the pension deal, this example also shows how an ALM study has the ability to make an explicit connection with the Dutch financial assessment framework (FTK) and with the IFRS requirements for the sponsoring corporation.

### Scenario analyses...

*“teach management more about the dynamics of their business, and how it might operate in various new circumstances”.*

*“help to prepare for all different conditions that can arise, therefore one knows what to do in any given situation”.*

*“because they record explicit assumptions about the future, and provide a common framework for discussion, they also contribute to a better understanding between managers”*

### Main features pension fund Hollandia:

Pension: conditional career average benefits scheme

Indexation policy for all participants: conditional on the value of the coverage ratio

- nominal coverage below 105%: suspending indexation;
- if the legally required buffers are available: full indexation
- in between these: interpolation
- real coverage ratio above 100%; then make up arrears

Premium policy:

- basic premium: cost-effective based on actual interest rate term structure (RTS);
- nominal coverage below 105%: raise premium so that recovery is realized in 3 years, taking into account a maximum premium of 20% (percentage of total wage)
- nominal coverage below legally required buffers: 15 year recovery plan, taking into account a maximum premium of 20% (percentage of total wage)
- coverage above legal premium reduction level: 1/5 of surplus available for premium reduction

Coverage ratio at start: 115% at nominal market value

**Main features IFRS:**

Most important requirement: Defined Benefit Obligation (DBO)

- Take into account future indexations
- Discount rate: corporate interest term structure

Funded status = Value investment – DBO

Prepaid, to be justified on the balance sheet = funded status plus (minus) deficits yet to be written off (surpluses), in which deficits (surpluses) are written off in 15 years

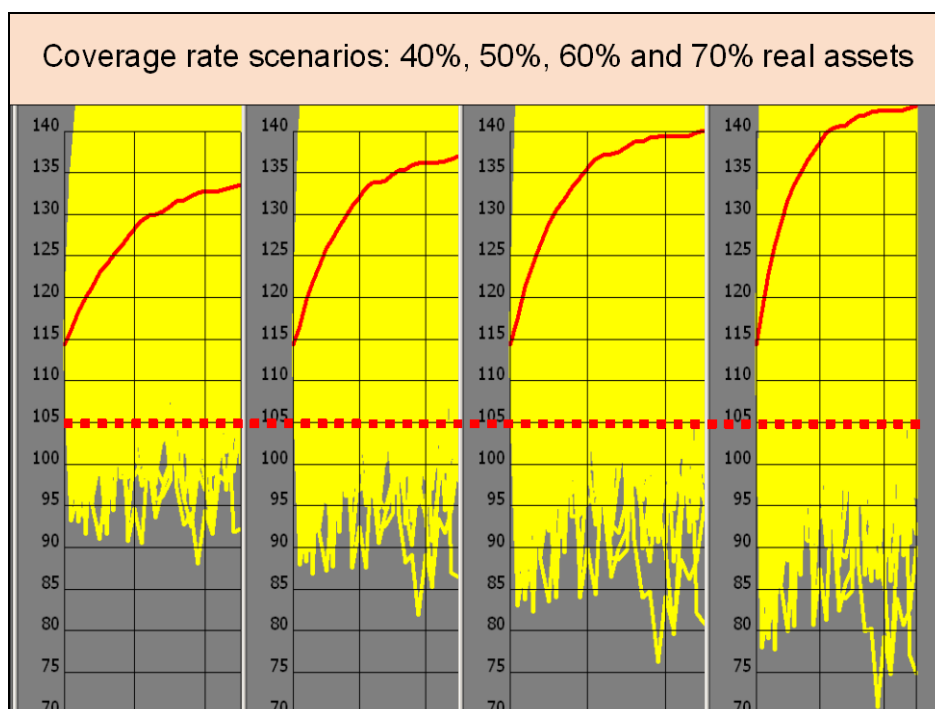
NPPC, Net Period Pension Cost, to be justified in Profit & Loss account corporation =

- service cost (costs of purchasing new rights)
- + interest cost (“satisfying” of the discount rate used)
- expected return on investments
- +/- write-offs

In this example, we will first clarify how in practice the maximum chance at funding shortfall is determined (= chance of nominal coverage ratio below 105%). Given the ALM policy, coverage ratio scenarios are generated for 4 strategic asset allocations, with 40%, 50%, 60% and 70% risky assets respectively, and with the interest risk fully covered.

Main characteristics of the used scenario set concern that the uncertainties, underlying correlations and long-memory in stock returns correspond with the period 1970-2006. An exception is made for the extreme high inflation between 1970-1975 and high interest rates in the years 1970-1981, so the statistically deviating behaviour of these periods is not extrapolated into the future. Moreover, the historical averages over the period 1970-2006 are not extrapolated to the future either, yet are determined based on expert opinion, as it is frequently done, in consultation with investment advice committees. The results are displayed in the figure below:

**Figure 4.1: Coverage rate scenarios: 40%, 50% 60% and 70% real assets**



The chances of funding shortfalls occurring given the scenarios used are listed in *Table 1*. Based on these data, the mix with 50% risky assets is appealing in the long term, because the chance of funding shortfall is significantly lower than 2.5%. *Figure 2* gives important additional information, however. First of all, it can be seen that for every 10% extra risky assets the bottom of the coverage ratio scenarios find themselves approximately 5 percentage points lower, and that the worst case scenarios, in particular with 70% risky assets, end up on a level a responsible pension manager would no longer dare to sign off on. Furthermore, *Figure 2* clearly shows that whenever a fund falls upon bad times, the coverage ratios do not deteriorate any further, and recovery always takes place after some time. Many of these observations can obviously also be displayed with suitable risk measures, see *Table 2*. But graphic displays do not only give better insight than the quantitative measures, but also supply more confidence.

**Table 4.1: Chance of funding shortfall**

Percentage risky assets	Chance of funding shortfall	
	Year 1-5	Year 16-25
40%	4.5%	1.7%
50%	7.0%	2.1%
60%	8.5%	2.6%
70%	9.6%	3.1%

In the past, ALM studies often steered too much at coverage risks only. But since the participants are increasingly apprehensive for incomplete indexation, and because companies as a result of the IFRS have to account for the consequences of the pension deal in their bookkeeping, the determination of these risk budgets are more and more drawing the attention that they deserve. The holistic approach accommodates this, see the consequences of the pension deal in *Table 2*. The growing attention for indexation risk does not need further explanation; in the Dutch case the introduction of a national indexation label has brought further awareness to this issue. The IFRS consequences in *Table 2* demonstrate why companies reporting under IFRS are increasingly seeking to get rid of pension risk. This is a very important push behind the recent rise of Collective DC. After all, it is widely held that a cookie factory should invest the entire risk budget in the cookie market, and thus has to cover the pension risk entirely in the financial markets.

**Table 4.2: ALM scores for the ALM policy with 50% real assets**

	Year 1 to 5	Year 16 to 25
Average coverage ratios		
- Nominal	122%	136%
- Real	84%	101%
-Discount rate: expected geometric real return	117%	130%
Volatility coverage ratio (nominal)		
- Standard deviation coverage ratio	7.4%	9.7%
- 2.5% Surplus at Risk	99%	107%
Solvability (nominal)		
- Chance of coverage below 100%	2.5%	0.9%
- Chance of coverage ever below 100%	8.6%	17%
Indexations		
- Expected buying power (% ambition)	99%	99%
- 5% level of Buying Power at risk (% ambition)	97%	93%
- Chance of incomplete indexation	28%	7.5%
Premium (in % of total wage)		
- Expected cost-effective premium	12%	15%
- Expected premium level	12%	8.0%
Financial Assessment Framework (FTK)		
- Chance of funding shortfall	2.5%	0.9%
- Chance of required buffer shortfall	27%	7.6%
- Average length of recovery from funding shortfall	2 years	2 years
IFRS		
- DBO (Defined Benefit Obligation)	78%	96%
- Prepaid (to be accounted for % DBO)	-29%	-14%
- Service Cost (costs new purchase under IFRS)	12%	13%

- NPPC (premium under IFRS, % total wage)	12%	8.0%
- Chance of negative Funded Status	95%	62%

Let us briefly focus on two scores from this table:

“*Chance of coverage ever below 100%*”: In many ALM studies the chance of a funding shortfall is reported at 0.9%, compared with the 2.5% probability of a funding shortfall maximally allowed in Dutch law (FTK). This depicts the probability that in a specific year during the period 16-25 years a funding shortfall materializes. The chance at ever becoming underfunded points out the probability of, at any time in the first 25 years, the pension fund facing a shortfall. This amounts to a probability of 17%! We are quite convinced that the Dutch pension sector as a whole is insufficiently aware of this considerable chance.

“*5% level of Buying Power at risk*”: This refers to the level of inflation compensation in the event that, at some point in time, it drops 5% below that level. Such risk measures will in all likelihood play an important role in the Dutch Indexation label, and consequently in ALM studies as well.

## 5 Strategic asset allocation: the compass and the depth gauge

Both in theory as well as in practice of ALM and Strategic Asset Allocation (SAA), there exist multiple approaches and optimization methods to determine the strategic asset mix. One can detect two main strategies, which in reality present itself in many hybrid forms and under various names. We will refer to these two main strategies as the long-term holistic approach and the short-term balance sheet approach.

### 5.1 Short-term balance sheet approach: LDI

The short-term balance sheet approach bases itself on the combination of fair value and the short-term characteristics of local regulatory frameworks and the IFRS. The concept of fair value primarily consists of the assumption that the present (forward) interest rates and inflation, regardless of extreme fluctuations, will render the best prediction for the long-term development. We know that changes in interest rates and inflation can have a dramatic effect on the liabilities and coverage ratios of pension funds and consequently – further magnified by the pension and IFRS regulations – impact the premiums, indexations and pension burdens. Asset managers in particular have shrewdly anticipated this development by marketing short-term balanced approaches under the label of Liability-Driven Investments (LDI). They shape the investment policy in such a way so that primarily the one-year coverage ratio risks are being controlled. In practice, this short-term driven approach is often configured as follows:

#### Liability-hedging portfolio (LHP)

These short-term LDI approaches start by creating the liability-hedging portfolio. This is the portfolio that exactly matches the pension payments resulting from the current liabilities. Because the market for long-term loans is simply not large enough to match all pension liabilities in this manner, the issue is usually solved by using swap contracts. These are exchangeable contracts (thus without underlying bonds) through which pension funds pay the short-term interest on the liabilities, in return for which they receive the required long-term interest from the counterparty in the swap. These swaps to create the LHP are the most crucial of the so-called LDI products. It is important to realize that most pension funds create a LHP which matches the nominal liabilities, but that some funds can afford to cover the real liabilities. Furthermore, it should be noted that the market for real swaps is currently much too small to match even the Dutch real liabilities alone, and as a result therefore very expensive as well.

#### Return portfolio and/or short-term risk budget

A pension fund with a liability-hedging portfolio (LHP) can further shape its investment policy in several ways. One very common method is creating a return portfolio with an additional one-year risk budget. The objective then is to generate a maximum portfolio return without violating the risk budget for that specific year. In close consultation with the sponsoring company, this risk budget can be determined as a Value-at-Risk (VaR) budget. In such a case, the pension fund and the sponsoring company decide in advance with what degree of probability a specific amount of capital may be lost for the year, while the sponsor benefits from the return generated through this VaR budget. The one-year risk-budget can also be defined in relation to the liabilities. We call this a SaR-budget for Surplus-at-Risk.

An oft-used approach here is to define the SaR-budget in such a way that the pension fund faces only a 2.5% probability, or even lower, to fall into a condition of underfunding or a low funded ratio.

### **The nominal versus real dilemma**

If the expected inflation would increase with 1%, and the nominal interest rate would accordingly rise with 1% as well, then the nominal funded ratio and the real funded ratio, given a duration of 15 [years], would irrevocably diverge by 15%.

Thus, measures like interest rate and inflation swaps will worsen the real funded ratio in equal measure as they protect the nominal funded ratio, and vice versa. The board of a pension fund is therefore permanently confronted with the problem of balancing nominal security against real ambitions.

These short-term, balance-driven LDI approaches have been very popular in recent times. However, there are some serious problems attached to it, to which we will briefly turn now.

A good pension deal captures an ambition that investors can accomplish given the risk appetite of the pension fund. But by continuously taking – admittedly well-founded – one-year steps toward this goal, the question arises whether these consecutive annual steps truly honour the strategic risk profile of the fund, and whether they ultimately fulfil the ambition laid down in the pension deal. Imagine, for example, the pension fund as a giant ocean liner. The short-term driven balance sheet approach can best be seen as steering exclusively on the depth gauge. Evidently, utilizing the depth gauge is of crucial importance if you do not want to strand the vessel, but it remains to be seen whether the ocean liner will ever reach its intended destination in this manner.

A striking example is the solvency trap in these short-term approaches. What we mean is that the approach to secure the nominal liabilities at 100% can easily result in an investment portfolio that consists exclusively of the matching portfolio of the nominal liabilities, but nothing more. The ultimate restriction, namely guaranteeing the nominal liabilities, is assured, yet the fund will have no room left for creating returns to support indexations and reductions in premiums. The solvency trap therefore represents an ocean liner that may never get stranded, but nevertheless has practically come to a halt with regard to its intended destination.

Of course, a short-term driven approach does not necessarily have to clash with an approach that strives to realize a long-term ambition. Generally speaking, however, short- and long-term interests do conflict. Two telling examples of this are the nominal versus real dilemma, as is briefly discussed above, and the fact that the long-term characteristics of many investment categories can be completely different from their short-term characteristics. As a result, many investments can serve the interests of the fund in the short term, but fail to do so in the long run, and vice versa. Short-term driving at nominal liabilities can actually hurt the long-term interests of the stakeholders. To distinguish between the short- and long-term characteristics of investment categories, we refer to the recent dissertations of Hens Steehouwer and Roy Hoevenaars.

An extremely relevant example of this problem is the correlation between stock returns and inflation, and subsequently between stock returns and the real liabilities. In the short term, this correlation is negative. Stocks therefore do not offer any protection against inflation and will as a result generally

perform quite badly in the LDI format. However in the long term, purely based on economic intuition and historical data, stocks *do* protect against inflation, a protection that goes unused by the short-term LDI approach.

Thirdly, a short-term driven approach neglects, almost by definition, the long-term consequences of other policy aspects of the pension deal. This is especially the case with the impact of the acquisition of new pension rights, and of the impact of the dynamic indexation and contribution policy on the recovery of the coverage ratio. Neglecting this fact, however, will result the unnecessarily overestimating of the risks of the pension deal, with obvious consequences that the investment policy that has been selected will be too risk averse.

## 5.2 Holistic target-driven long-term approach

The investment policy of pension funds has to exploit the available risk budgets in the most aggressive and efficient ways possible. Only then will investors generate the returns that can realize the ambition originally set in the pension deal. Therefore, in this vision, the strategic investment policy can not exclusively rely on information provided by the depth gauge. No, it must steer its course based on the broad trajectory of the compass as well. With ALM this is made concrete by two main quests, namely what is the natural asset mix that accommodates the pension deal most successfully, and based on what reasons could or should we possibly deviate from this mix.

### The natural asset mix

We define the natural asset mix can as the optimal asset mix provided that the pension fund is in a steady state. This is the case when the fund is not limited due to violations of the short-term restrictions, and when investment experts consider the financial markets in a stable condition, i.e. neither over- or undervalued. Therefore the natural mix represents the allocation of strategic asset categories that can realize the ambition established in the pension deal while simultaneously respect its appetite for risk. The natural asset mix is thus “long-term target-driven” (LT-TD), with the target expressing a duality consisting of the ambition and the coinciding risk. In a neutral financial environment this allocation is always adhered to as long as the short-term risk implications are not considered too high. That is why this is often called the desired asset mix.

A few comments regarding the “LT-DT” mix are justified: because the natural mix seeks to realize the ambition set in the pension deal while at the same time honouring the long-term risk limits, “optimizers” searching for this asset allocation will not only look for investment categories that are likely to generate the necessary return, but especially for those that can offer protection against the long-term developments of the real liabilities as well. In investors’ jargon: the investment benchmark is shaped by the long-term developments of the real liabilities. Note how especially in the natural SAA of the pension funds, a number of “alternative investments” can deliver great additional value.

Even in the case of the long-term driven natural SAA, it is irrational to take risks if one cannot expect sufficient yield in return. With this in mind, pension funds should pay close attention to the “natural matches” of the SAA. Think again of the correlation between stock and inflation which looks negative in the short term, but becomes positive in the long run. Thanks to such “natural matches” pension funds can afford, contrary to the results of a short-term LDI approach, to purchase fewer coverage products,

since the intended coverage is already embedded in the natural SAA. In addition, the establishment of the natural SAA also brings up the dilemma that “nominal” and “real” can conflict with one another, and the issue to which degree the financial markets can absorb the elimination of mismatches.

Finally, we want to point at the possibility to protect the natural SAA. It is more efficient to achieve a probability of underfunding of, let’s say, 1-2% with target-driven financial products, than to spin the big wheel of “stock-fixed rent” endlessly into the safe direction until the probability of underfunding in the ALM study reaches the desired level. Sensible merchant advice holds that it is only efficient to purchase protection if you are doing well and protection therefore is relatively affordable. After all, who is willing to insure a burning home? Furthermore, it is of practical importance whether the market for these products is liquid enough in order to take over these risks from the pension funds for an affordable price.

### Adjustments to the natural asset mix

There are two main reasons to make adjustments to the natural asset mix, namely (1) when the financial markets are deemed instable, and (2) if the coverage ratio becomes instable and the probability of underfunding is higher than management considers warranted.

#### **(1) Financial markets imbalanced**

Interest risk goes unrewarded in a balanced situation, but is it nevertheless a rational move to cover it, for example, at a ten-year interest rate of 3%? In practice, we can detect two visions: (1) Fair value supports the notion that the present is the best prediction for the future and, accordingly, that it is never rational to deviate from the natural mix based on developments in the financial markets. Such a point-of-view would make economists and investment analysts superfluous, yet from a historical perspective it can hardly be justifiable in the long term. (2) The second vision, which we refer to as the economic vision, requires an outlook on the financial markets and a subsequent assessment of their specific condition. To optimize the deviation of the natural mix based on this information is the subject of risk-budgeting studies. These studies typically have a horizon of 3-5 years, unlike the long-term horizons of the ALM studies.

#### **(2) Short-term probability of underfunding too high**

An extreme method of deviating from the natural asset mix could be to annually re-commit to a one-year SaR budget. It should be clear that in such a scenario the short-term interests completely dominate the long-term ambition. Thus, it effectively transforms the long-term approach into a short-term LDI. At the other end, one could decide to fully disregard all of the short-term risks, and keep navigating a long-term course. As with the infamous Titanic, such a strategy could be extremely dangerous. Neglecting the short-term focus of national pension regulations, the IFRS and essentially of the participants in the fund themselves could easily become the proverbial icebergs for today’s pension funds.

Pension funds will have to find a healthy balance between striving toward the long-term ambition and readjusting along the way in order to control short-term risks. They should therefore navigate with both compass and depth gauge. This can be practically attained by connecting the SAA in advance to the levels of the nominal and real coverage ratio, and to research in an ALM study whether this results in a balanced picture of the degree to which the long-term ambition is achieved and the short-term risks are controlled. However, based on these investment ladders it is often mandatory to sell risky assets

when prices decline. This could result in managers mixing up strategy and tactics, and no longer execute the planned strategy according to the investment ladder. This will cause the actual risks to become much larger than the ALM study had originally suggested.

That is why the alternative becomes more relevant, in which the natural SAA is no longer adjusted based on prior agreements, but instead is being combined with a monitoring process. It will effectively monitor if more drastic setbacks are actually taking place than had been accounted for in the beginning, and consequently, if lower coverage ratios are occurring than are desired or even allowed in the pension deal. When the monitoring process gives a warning signal, management can judge the dangers involved and, if necessary, change the investment policy to one that is, given the situation at the time, considered the most efficient.

## 5.3 Positioning

The fundamental choices pension funds will have to make regarding the SAA are therefore:

- Do we operate based on a long-term ambition, limited by short-term restrictions, or do we operate from short-term balance sheet management approach?
- Do we strive toward a real ambition, or do we focus more on nominal security?
- Do we decide in advance how to adjust the SAA under certain circumstances, or do we make adjustments as we go, based on the specific conditions at the moment?

Unfortunately, there is not one single perfect solution. Each choice has its own advantages and disadvantages, often depending on the specific situation of each pension fund. To an industry-wide pension fund with little or no continuity risk, these choices are from the very start significantly different than to a company pension fund with the sponsoring company reporting under the IFRS. The authors here prefer the following strategy: always have the long-term ambition in mind, but seriously take into account all of the short-term restrictions along the way. After all, if these restrictions are completely neglected, the long-term ambition will be in grave danger as well.

With respect to adjustments of the SAA there is no holy grail either. To decide in advance what the fund should do under certain circumstances evidently has its advantages, but whether the policy will actually be implemented along those predetermined agreements still remains to be seen. Also, the recent credit crisis has taught us that intended adjustments might be impossible to implement because the required products may not be available. Adjustments based on the latest information, on the other hand, can often be too little, too late. In general, we do not favour to firmly establish “automatic” future policy adjustments up front. Important exceptions to this position are a predetermined policy ladder in which, depending on the position of the nominal and real coverage ratio, either the nominal or the real mismatch is given priority; and coverage ratio-dependent protection constructions of investments in equity.

The key message, however, should remain clear: lay down an ambition that is feasible under the risk appetite of the pension fund and which follows a suitable investment policy plan. But no long voyage should be navigated fully on autopilot, and one must therefore always keep a close watch on both compass and depth gauge, so that, if the situation truly demands it, one has the ability and good sense to redirect its course.

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