

Strategic Risk Management and Risk Monitoring for Pension Funds

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The worldwide credit crisis has also led to financial problems for pension funds. In a large number of countries, there are doubts about the sustainability of the pension system. In the Netherlands, in addition to the cost of longevity, pension funds were hit hard by dropping investment returns and low interest rates. Mid 2010, the average funding ratio for Dutch pension funds was 100%. Of all Dutch pension funds, around 65% was underfunded (that is, had a funding ratio below 105%). Weighted with the number of participants, these underfunded pension funds represent 88% of the Dutch market¹. As a consequence, pension premiums are raised, and pension rights cannot be indexed and in the near future even have to be lowered. The public illusion of a guaranteed pension is shattered. The current crisis reemphasizes the necessity of a well founded strategic risk management that focuses on funded ratio risk, rather than on implementation risk. In this paper we describe our methodology on how strategic risk management of a pension funds should ideally be organized.

Key issues

As the return on a risk free investment portfolio will usually be too low to guarantee, at an acceptable contribution level, the long term ambition of a pension fund, a pension fund will have to take risk. The first key question then is how much risk the stakeholders are willing to take (i.e., what is the risk appetite), distinguished in funded ratio risk, contribution risk and pension risk. E.g. in The Netherlands indexation of the pension rights is conditional on the solvency level, so that a limit on maximal indexation is a crucial risk budget within the system. The second question is how this risk is going to be managed. In particular, in which extent should investment risk be reduced if the funded ratio weakens, and, should these risk-based decisions be influenced by forward looking views on the performance of the financial markets?

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 a 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 responsible, 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.

A third issue concerns the struggle of hedging either nominal or real interest rate risk. The impact of this choice between nominal and real can be enormous. For instance, if a pension fund chooses to hedge the nominal interest rate risk, the nominal funding ratio is protected from further drops in the interest rate. However, if instead inflation and interest rates rise, the real funding ratio can drop dramatically. So steering in nominal terms can seriously affect the real ambitions.

Asset Liability Management and Strategic Risk Management

The objectives of Strategic Risk Management and Asset Liability Management (ALM) are:

1. ALM: support the choice of the risk (and return) appetite of all stakeholders, including the policy horizon, and specify an integral ALM policy that given the specified risk limits maximizes the ambition of the fund.
2. Risk Management: manage these risks and returns in an unfolding and changing environment.

¹ Source: De Nederlandsche Bank (DNB). The funding ratio is measured as the market value of the liabilities divided by the market value of the assets.



This process is illustrated in Figure 1.

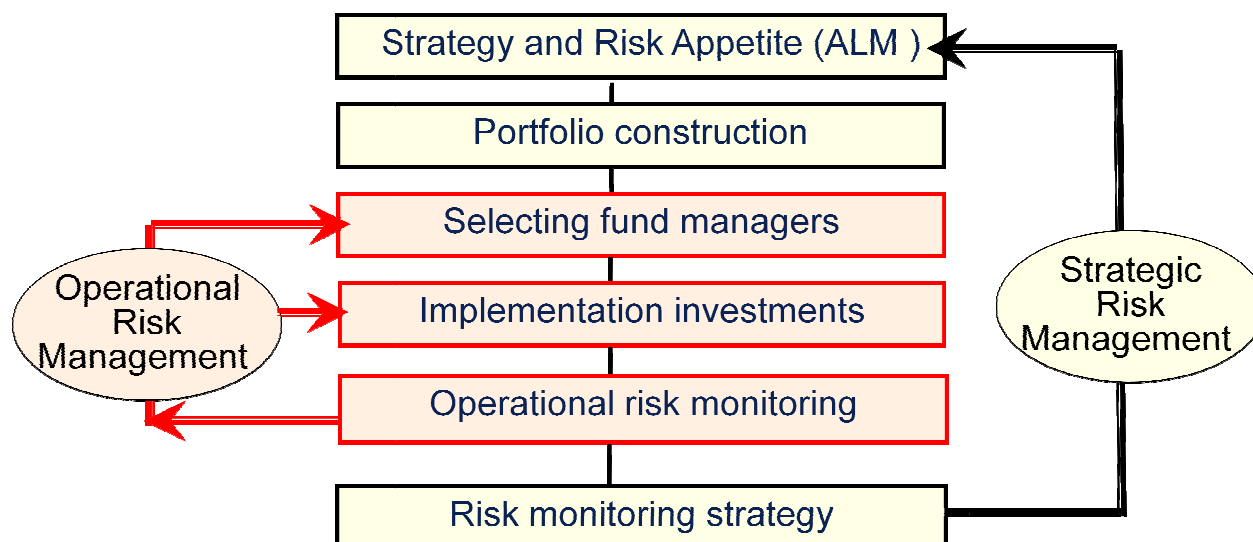


Figure 1: Risk Management and ALM

Asset Liability Management

ALM not only involves establishing the risk appetite of all stakeholders, but also establishing the strategy that takes into account these – potentially conflicting – risk appetites in the best possible way. We define the natural asset mix 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 not in a structurally unstable condition. Therefore the natural mix represents the allocation of strategic asset categories that can realize the ambition established in the pension deal while simultaneously respecting its appetite for risk. This allocation is always adhered to as long as the financial environment is considered “neutral” and the risk implications are not considered too high. The natural asset allocation is also referred to as the desired asset mix.

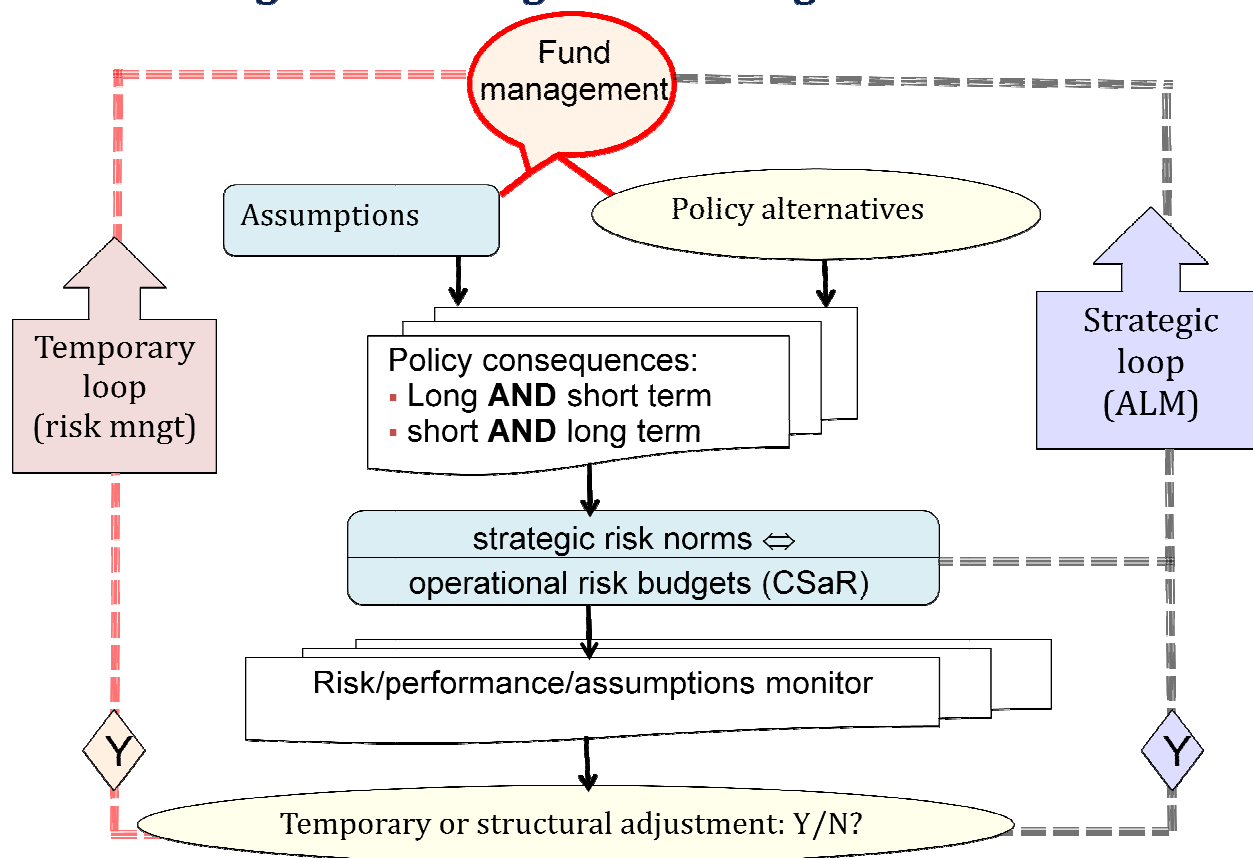
To find the desired asset mix of a pension fund, ALM studies utilize the technique of scenario analysis². Scenarios are future trajectories modeling the external insecurities that managers must take into account in their policy determination and evaluation. They concern inflation, interest rates, currencies, 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 corporate 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 funding ratios.

Strategic Risk Management

There are three main reasons to adjust the natural asset mix, namely (1) when the financial markets are temporarily unstable (for instance, due to quantitative easing by governments), (2) if the economic views are structurally changed (for instance, lower equity risk premium, lower (real) interest rates) and (3) if the risk limits are under threat or even violated (for instance, the probability of underfunding is higher than management considers warranted). The decision whether or not to adjust the natural asset mix is part of Strategic Risk Management. Figure 2 illustrates the strategic risk management process.

² See for instance Boender, G., C. Dert, F. Heemskerk, and H. Hoek (2007), “A Scenario Approach of ALM”, Chapter 18 in S.A. Zenios and W.T. Ziemba (Eds.), *Handbook of Asset and Liability Management*, Vol. 2, Elsevier, North Holland, pp. 829-860.

Figure 2: Strategic Risk Management



Pension funds should find a balance between continuously adapting their policy based on short term developments and sticking too long to their long term policy. In our opinion, the agreed upon strategy and risk appetite are leading. Furthermore, all assumptions that formed the basis of this strategy should be monitored. Indeed, if the assumptions underlying the strategy are no longer considered valid, the strategy is no longer valid. Temporary deviations should lead to temporary policy adjustments that take into account short term consequences (this is often called risk management). Structural changes to the assumptions should lead to structural adjustments of the pension deal (this is often called ALM). Both aspects are an integral part of Strategic Risk Management.

It is important to clearly define the decision making process beforehand. We distinguish four components of strategic risk management:

1. Risk component
 - a. What actions are undertaken if the risk limits are in danger or violated?
 - b. Is risk management action undertaken irrespective of macroeconomic views?
 - c. Which detection and decision processes are followed?
 - d. Which actions are we allowed to take?
2. Investment component

Does the macroeconomic view play a role? If so, formalize a predefined process of information provision and decision making to temporarily or structurally adjust the strategy
3. Governance component

Establish who is responsible for what, also in case of crises. Otherwise nobody is responsible if things go wrong. Or different committee's undertaken "incomplete" actions. For instance: the risk committee decides to hedge short term risk without taking into account long term ambitions. Or the investment committee advises a decision to accommodate the long term ambition while exceeding short term risk limits.
4. Monitor



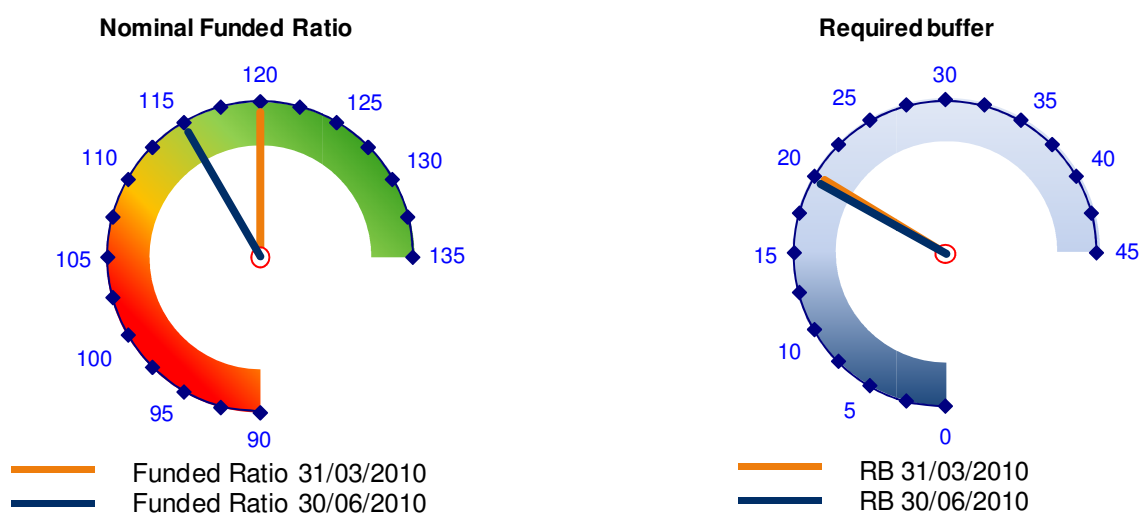
Which information should the monitor of the strategic risk management process contain?

Monitoring reports

Up-to-date and easy to understand risk monitoring reports are an essential tool to support pension fund management in their Strategic Risk Management. Fund management should be able to develop a considered opinion based on these monitoring reports. Monitoring reports typically contain:

1. The **status quo** with respect to a number of key statistics like risk limits and the funding ratio. Figure 3 gives a graphical example.

Figure 3: Change in solvency of the fund compared to the previous quarter



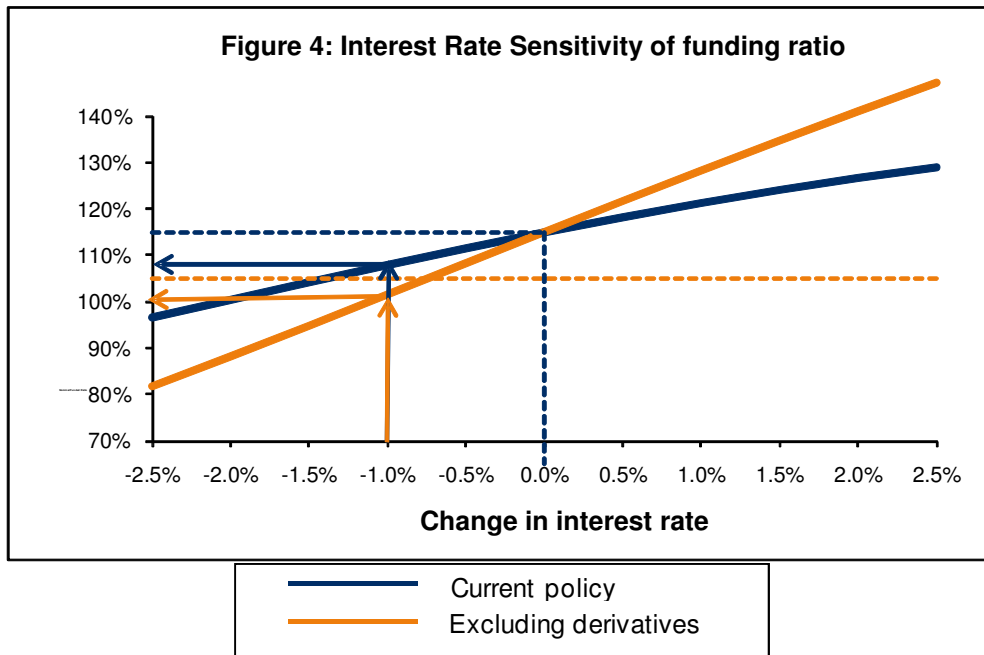
With a funding ratio of 115%, this fund does not meet the required buffer of 20%.

2. **How** did the changes in the status quo take place? Table 1 provides an example based on Dutch regulations. In this table, the impact of several contributors to the funding ratio development are exposed in an ex post analysis.

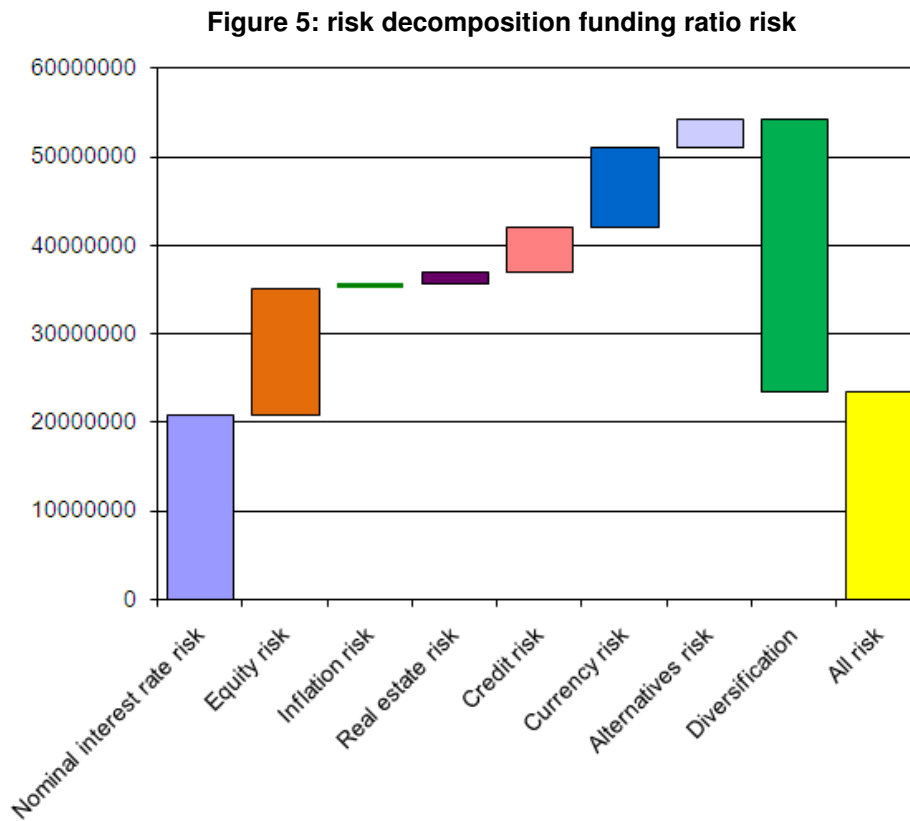
Table 1: Causes of the change in the funded ratio								
Year	Funded ratio 2009 Q4	Contribution M1	Payments M2	Indexation M3	Yieldcurve M4	Excess-return M5	Misc. M6	Funded ratio 2010 Q2
	%	Δ%-point	Δ%-point	Δ%-point	Δ%-point	Δ%-point	Δ%-point	%
2010	118.5%	1.0%	0.8%	0.0%	-9.1%	4.6%	-0.8%	115.0%

3. **Risk decomposition:** Where do the current risks come from? This concerns in particular an overview of the sensitivity of the funding ratio to the most relevant risk drivers and the effectiveness of risk policy. Figure 4 presents a graphical example for interest rate sensitivity and the effectiveness of a hedging strategy using derivatives.





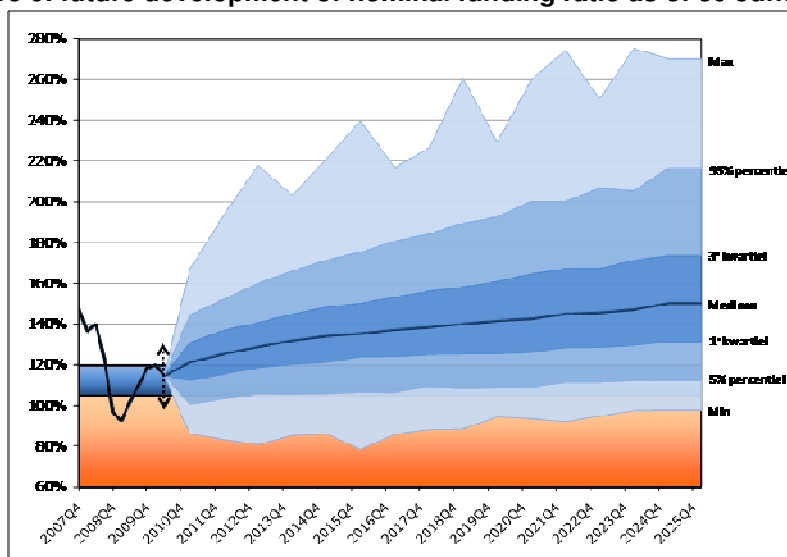
Risk decomposition shows the impact of the underlying economic risk factors on the total risk; and the diversification effect between the different risk factors. An example is provided in Figure 5, where risk is defined as the average funding ratio minus the 95% Surplus at Risk.



- Future** risk-return perspectives. Use ex ante analysis to monitor strategic risk limits. For example, an ex ante analysis of possible future developments of the funding ratio as in Figure 6.



Figure 6: future development of nominal funding ratio as of 30 June 2010



Orange rectangle: underfunded (<105%), dark blue rectangle: insufficient risk buffer (<120%)

- Analyze consequences of **stress scenarios** such as hyperinflation, deflation or stagflation. We consider it of crucial importance that the consequences of policy changes triggered by stress scenarios are not only, as usual, evaluated on their short term consequences, but that the long term consequences are taken into account in the decision making as well.

Conclusions

The fundamental choices pension funds will have to make regarding their investment policy are:

- What are the risk limits of all the stakeholders, both in equilibrium, and on the short term, and which ALM strategy, including the strategic asset allocation satisfies these risk limits in the most efficient way?
- How do we deviate from the strategy from a risk management point of view?
- How do we deviate from the strategy given our view on the financial markets?
- What is the content of the monitor that optimally serves the dynamics of strategic risk management?
- What is the governance of strategic risk management?

The key message is clear: lay down an ambition that is feasible under the risk appetite of the pension fund and which is accompanied by a suitable investment strategy. But no long voyage should be navigated fully on autopilot, and one must therefore always keep a close watch on the risk monitoring reports, so that, if the situation truly demands it, one has the ability and good sense to redirect its strategic course.

