The impact of new capital requirements on asset allocation for Dutch pension funds

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Laurens Swinkels

obtained his Masters and PhD in Econometrics at the Center Graduate School of Tilburg University. He joined the Quantitative Research department of the Robeco Group in April 2004. Before this, he was part-time researcher at ABP Investments for and a quantitative analyst at PensionFactory. Dr Swinkels has published articles in the *Journal of Empirical Finance* and *Journal of Asset Management*, among others.

Abstract Newly proposed regulations in the Netherlands require pension funds to allocate capital reserves for mismatch risk between assets and pension liabilities. This makes the true benefits and costs of a defined benefit pension system more visible. It also implies that risk taking by a company through its pension fund is not for free anymore. This paper shows that the costs of holding capital reserve can be substantial and argues that these should be incorporated when determining the fund's strategic asset allocation. The asset management industry is expected to respond by developing new products that are based on the liability structure of the pension fund and the new regulatory environment.

Keywords: *capital requirements; investments; regulation; risk management; strategic asset allocation*

Introduction

Retirement savings schemes have grown enormously over the past decades. In the Netherlands alone, pension fund assets are €427bn, while for life insurance companies this was €224bn at the end of 2002. This is a substantial amount compared to the gross domestic product of the Netherlands of €444bn in 2002. It is surprising to see that pension fund legislation has been lagging behind, relative to other financial institutions such as banks and insurance companies. Recently, however, the Dutch political debate has resulted in a set of new guidelines for risk management of pension funds. The imminent merger between the Dutch Central Bank —

DNB — and the pension and insurance supervisory authority of the Netherlands — PVK — in 2004 may accelerate the professionalisation of supervision of pension funds. This is a huge step forwards for the pension fund industry and will undoubtedly have a big impact on the way companies and employees look at their pension schemes, and more importantly, the way pension funds manage their assets and liabilities.

Pension funds will be confronted with risk-based capital requirements, built on the financial economics that is the fundament for financial risk management for banks. The basic idea behind the new capital requirements is that the value of both assets and liabilities should

Laurens Swinkels
Office 16–26,
PO Box 973, NL-3000 AZ,
Rotterdam,
The Netherlands.
e-mail: l.swinkels@robeco.nl

be marked-to-market regularly. The amount of mismatch between assets and liabilities that may cause financial losses under some stress scenarios determines the capital that is required as a financial reserve. While this is just common sense for banks, for the pension fund industry this is a ground-breaking development.

Complementary to the advances in national regulation, the European Union has adopted the International Financial Reporting Standards (IFRS) as the reporting format for firms with a listing at a European stock exchange. For companies with a mismatch between assets and liabilities in their pension fund, the influence of volatile financial markets will become visible on the balance sheet and/or profit and loss account. Although under the current standards (IAS 19) smoothing out this volatility is still allowed, this is expected to disappear in the future if full fair value is introduced for pension accounting. A study group of international accountants is working on a substantial revision of current standards.

The current low coverage ratios and high capital requirements have lead to a reconsideration of strategic asset allocation of many pension funds, as well as plans to redesign the defined benefit (DB) pension schemes altogether.

Capital requirements and strategic asset allocation

In a recent paper, Cooper and Bianco¹ investigate equity financing of corporate DB liabilities. They conclude that holding equities creates no value for the shareholders of the corporate. Investing in equities through the pension plan increases the required compensation by the shareholders though the increased level of market risk to which the firm is exposed. In addition, financing the pension liabilities by issuing more debt instead of equity has a tax advantage.

Cooper and Bianco¹ blame biased pension accounting rules which have created a case for equities that cannot be explained from a pure financial economics point of view. They suggest matching with fixed income instruments as the optimal asset allocation.

In the Netherlands, the pension deal between company and employee is somewhat special. Companies usually commit themselves to nominal pensions, but generally express the ambition to protect pensions against inflation once these payments have started. The decision of inflation-indexation is made on a year-by-year basis, and usually depends on the coverage ratio of the fund. This inflation-protection is usually not a formal obligation from the company to the employer, and has a defined contribution (DC) character. It is, however, not the same, as premium contributions of the firm are not compulsory above a certain company-specific threshold level. In fact, if the coverage ratio is sufficiently high, the company may redeem contributions from the pension scheme. For such plans, it can make sense to invest in assets with a risk premium, also in the framework of Cooper and Bianco.¹ Other stakeholders, such as the employees, might be better off with this collective pension provisioning as opposed to investments by each individual.

The Dutch parliament has recently indicated that pension funds with a high risk profile should have higher financial reserves than funds with a low risk profile. In banking and insurance industries this line of thinking is common practice. Before September 2002, however, a pension fund with a coverage ratio of 100 per cent with a pure matching strategy was considered equally risky as a fund which invests 40 per cent in equities. In September the PVK communicated rough guidelines

with buffer requirements in which equity exposure was considered more risky than bond exposure. Thereafter, the PVK issued a series of consultative papers in which it indicates that the required financial buffer is an increasing function of the mismatch between the asset and liability portfolio of the pension fund. Political compromises have since reduced the level of these requirements substantially, but the basic idea that more mismatch implies higher buffers is still firmly in place. These buffers introduce additional costs for the corporate sponsoring the plan, since the capital locked up in the financial buffer cannot be used for its operations. It depends on the cost-of-capital for the corporation as a whole how much holding the buffer actually costs.

In addition, due to the introduction of IFRS, the mismatch between assets and liabilities causes the CFO to bear the risk that the pension asset returns destroy the company's operating performance in a given year. Or vice versa — high abnormal returns on pension fund assets can and have been used in the past to hide disappointing firm operating performances. Hence, the optimal asset allocation of the pension fund follows from the risk profiles of the stakeholders after taking into account all costs and benefits. This includes not only the lower average premium level that can be obtained by investing in high expected return strategies, but also the funding costs for holding the required financial buffer. This considerably reduces the advantages of investing in risky assets for corporate DB plans in addition to the theoretical results put forward by Cooper and Bianco.¹

In principle, the regulatory authority has the power to influence the optimal asset allocation by increasing or decreasing the capital requirements for each of the asset classes. It is likely that

the finance industry will respond to these regulations by offering financial products to pension funds that make use of relatively underpenalised risk factors. Or, if overall requirements are set too high, company-sponsored DB pension plans are going to disappear altogether in the Netherlands. Several Dutch companies, such as Philips and Akzo Nobel, have already talked to trade unions about a transformation from DB to DC retirement schemes.

Capital requirements: A stylised example

This section determines the required capital for a pension fund with an initial coverage ratio equal to 100 per cent with two possible allocations. The first is the traditional (Dutch) allocation of 60 per cent in government bonds and 40 per cent in stocks. The duration of liabilities in the Netherlands is on average 16, while the duration of bonds in pension fund portfolios is on average five. This interest rate risk would result in an additional financial buffer of about €14. In the examples presented here, assume that the pension fund matches the duration of its fixed-income assets with its liabilities. The second allocation is a pension fund that matches most of its liabilities and in addition buys a call option on the stock market. The latter allocation reduces the sensitivity of the coverage ratio to declining stock markets, while upward movements still allow for positive expected returns.

The financial buffers are calculated in accordance with the consultative White Paper issued by the PVK in early 2003. They initially proposed a 99.5 per cent confidence level, but political compromises have led to a confidence level of 97.5 per cent, which is equivalent to a 2.5 per cent probability of underfunding on a horizon of one

Table 1: Stylised example of the new proposed capital requirements for Dutch pension funds for three types of asset allocations

Capital requirement	Traditional: €60 bonds + €40 stocks	Matching: €100 bonds	Alternative: €96 bonds + €4 options
Interest rate risk (Return: +15%)	$-\text{€}40 + \text{€}46 = \text{€}6$	€0	$-\text{€}4.0 + \text{€}4.6 = \text{€}0.6$
Stock market risk (Return: -30%)	$\text{€}40 - \text{€}28 = \text{€}12$	€0	$\text{€}4.0 - \text{€}3.7 = \text{€}0.3$
Volatility risk (15% instead of 20%)	€0	€0	$\text{€}4.0 - \text{€}2.7 = \text{€}1.3$
Subtotal (Method of squares)	€13.4	€0	€4.3
Total reserve 97.5% (Multipl.factor 1.19)	€16.0	€0	€5.1
Total reserve 99.5% (Multipl.factor 1.56)	€20.9	€0	€6.7

year. The main points from the consultative White Paper can be seen in Appendix A.

In Table 1 the required capital is shown for the three investment strategies under consideration. Note that the focus here is on financial risks and buffer requirements for actuarial risks such as assumed mortality rates, transition probabilities, etc are left aside. It must be emphasised that these are proposed guidelines and might be amended before the actual regulation comes into effect.

Using Table 1 it becomes clear that a pure matching strategy is optimal if the objective is to minimise the solvency requirements from taking financial risk. The traditional allocation has downside exposure to both the equity as well as the interest rate factor. This requires a buffer of 16 per cent of the underlying value. Although the outline of the new regulation, which has recently been accepted by the Dutch parliament, allows pension funds to build up these reserves over a 15 year period, adding solvency capital could mean a severe blow for the financial situation of the sponsoring company. The alternative allocation, in which stock market options are bought instead of taking the underlying stocks in portfolio, requires about 5.1 per cent buffer. This is due to both lower interest

rate and equity market risks.

The reduced capital requirements for the allocations with less downside risk seem to be particularly attractive for the companies sponsoring the pension schemes. However, lower capital requirements means less risk, and this in turn means that less risk premium is captured, or stated otherwise: higher contribution rates due to the lower expected investment returns.

The ultimate purpose of taking investment risk in the pension fund is to reduce the average contributions of the firm, while providing a decent pension to its retiring employees. The unconditional expected return on the traditional portfolio is higher than the matching portfolio, once we believe that stocks or other risk factors carry a positive risk premium. However, even when this risk premium is realised, the capital requirements as put forward by the Dutch regulatory authority on risky investments substantially reduces the benefits for the company. This is not an attack on the new policy of the regulator. On the contrary, the regulator correctly points out that risk taking is not for free. In the first row of Table 2 the expected asset return minus the expected liability return is shown, using the assumptions discussed in Appendix B.

Table 2: Expected returns and costs for the firm to hold the required financial buffer for three different pension fund asset allocations

	Traditional	Matching	Alternative
Expected return	$€3.0 + €3.2 - €5.0 = €1.20$	$€5.0 - €5.0 = €0.00$	$€5.8 - €5.0 = €0.83$
Buffer costs (at 5%)	$€0.80 - €1.05$	€0.00	$€0.26 - €0.34$
Buffer costs (at 6%)	$€0.96 - €1.25$	€0.00	$€0.31 - €0.40$
Buffer costs (at 7%)	$€1.12 - €1.46$	€0.00	$€0.36 - €0.47$

The value of expected returns should be confronted with the costs of the firm to hold these risky assets. It is shown that for the 97.5 per cent measure a pension fund with a low cost-of-capital earns in expectation $€1.20 - €0.80 = €0.40$ after buffer costs. For an increased level of certainty of 99.5 per cent, the benefits of equity investing reduce to $€1.20 - €1.05 = €0.15$. For the alternative allocation, the gross return is substantially lower, $€1.20$ versus $€0.83$, but the net return of $€0.57$ is actually higher. A similar line of reasoning holds for firms with a higher cost-of-capital, but for them equity investments may generate a loss once buffer costs are taken into account. So, firms with higher costs-of-capital have an incentive to invest more in the matching or alternative portfolio, as the costs of mismatch for firms with a cost-of-capital of 7 per cent is higher than the expected return on the investments.

In a perfect world, the compensation for undiversifiable business risk does not depend on the capital structure of the firm. Hence, Cooper and Bianco¹ conclude that financing pension liabilities with equity is merely a leveraged and tax-inefficient bet on the stock market. The new risk-based requirements demanded by the Dutch regulator imply that when the firm chooses to increase its business risk by exposing itself to undiversifiable stock market risk, it needs to acquire additional financial reserves.

These reserves counterbalance, at least partly, pension funding risks imposed on the shareholders of the company. This shows that taking risk through the pension fund is not free, at least, not anymore.

Conclusions

This paper has observed that Dutch pension fund regulation is in the process of catching up with the supervision in place for the banking industry. The basic idea is that the pension fund should have a financial reserve based on the mismatch between its assets and pension liabilities, both measured at market values. It is a huge step forward for the pension fund industry that, due to the introduction of this new regulatory framework in the Netherlands the true benefits, costs and risks of a DB pension system are recognised. This development will most likely lead to a more transparent pension system with a financially sounder basis. This will be necessary in the period ahead, where pension payments will be of major importance for many Dutch citizens.

The paper analysed the consequences of the newly proposed buffer requirements for Dutch pension funds. Holding a financial buffer for risky investments poses a non-negligible cost for the average Dutch corporate sponsoring a DB pension plan. This might induce firms with a higher cost-of-capital to stick with less risky investments that require a lower buffer.

The finance industry is challenged to develop products that are tailor-made to the specific pension fund, and fit with the new risk-based supervisory framework.

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Appendix A: Proposed capital requirements for Dutch pension funds

The proposed requirements set out in the Netherlands Pensions Authority's White Paper² are based on mismatch risk between assets and liabilities. The value-at-risk (VaR) of each of the identified risk factors should be viewed in isolation and accumulated such that the largest risk has the highest weight. Thus:

$$\text{Buffer requirement} = 1.56 \times \sqrt{[\text{VaR}_1]^2 + [\text{VaR}_2]^2 + \dots + [\text{VaR}_6]^2}.$$

The factor 1.56 is chosen to get from the 95 per cent VaR to a 99.5 per cent VaR at the pension fund level, approximately equal to the risk of a bond with BBB-rating. The factor 1.56 reduces to 1.19 when the confidence level is 97.5 per cent instead of the proposed 99.5 per cent. The VaR should

be calculated for sensitivities to the following six risk factors:

- stocks;
- private equity;
- direct real estate;
- commodities;
- volatility; and
- interest rates (including spread).

For example, the reduction in market value of the entire portfolio should be measured for a decrease of the relevant stock market of 30 per cent, assuming that once every 20 years the stock market drops on a one-year horizon by this amount. Formally, the biggest loss over the interval [−30 per cent, 30 per cent] produces the relevant VaR, since the use of derivative instruments with the stock market as an underlying asset should be included as well. The contemporaneous effect of other risk factors is not (yet) taken into account.

Appendix B: Assumptions for the calculation of expected returns

The Dutch regulator has posted maximum levels for bond returns and the equity risk premium. Bond returns are not allowed to exceed 5 per cent per annum, and the equity risk premium is capped at 3 per cent. These numbers serve as input for the calculations in section 2, where (nominal) liabilities also grow at the 5 per cent rate.

The call option on the stock market has the following characteristics. The stock market is currently valued at €40, the strike of the option is €39 to correct for the 2.5 per cent dividend return. The interest rate is 4.5 per cent, the implied volatility is 20 per cent, and the time to maturity equals one year. The Black-Scholes price of the option is €3.98 and has been rounded in the text to €4. We present the purchase of a call

option, but the same payoff profile can be generated by buying the stocks, a put-option, and a short position in bonds (due to the put-call parity).

The expected return on the stock option is calculated by

$$\begin{aligned}\text{Expected option return} &= \\ &4.5\% + \frac{\text{€}40}{\text{€}4} \times 0.61 \\ &\times (8.0\% - 4.5\%) = 25.8\%,\end{aligned}$$

where 0.61 is the option delta, ie the sensitivity of the option to the stock market. This formula is taken from Cox and Rubinstein.³

The expected nominal gain of the option for the pension fund is $\text{€}4 \times 25.8\% = \text{€}1.03$, while the liability value increases in expectation by $\text{€}4 \times 5.0\% = \text{€}0.20$. The expected profit from the option position equals $\text{€}0.83$.