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Risk-Based Supervision of Pension Institutions in Denmark

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Abstract

This paper examines the move towards risk-based supervision of pension institutions in Denmark. Although Denmark has not adopted a comprehensive model to assess risk it has developed a number of building blocks which it uses for risk-based assessment. The motivations for improving risk assessment include a desire to identify emerging problems, and concerns about the solvency of pension institutions. In Denmark there is extensive use of guaranteed minimum returns in both the accumulation and payout phases which create substantial obligations on pension institutions, and focus attention on the integrity and solvency of the institutions which provide them. In conjunction with freeing up investment restrictions and moving towards market valuation of assets, the supervisor has introduced a 'traffic light' stress test model which calculates the effect of several market scenarios – the red test which is the more plausible and the yellow test which is possible but less likely. In addition to the use of the traffic light system, there has been a growing emphasis on the adequacy of internal risk control systems and greater reliance on market discipline. Pension institutions have sought to reduce their exposure to market volatility by better matching of assets and liabilities. There is a much better understanding of the risks inherent in the pension institutions' portfolios, and there has been a substantial increase in the use of hedging instruments.

This paper—a product of the Financial Policy Division, Financial Systems Department—is part of a broader project on risk-based supervision of pension funds conducted in collaboration with the IOPS - the International Organization of Pension Supervisors, and also part of a broader effort of the department to improve the performance of private pension systems. Policy Research Working Papers are also posted on the Web at http://econ.worldbank.org. The project coordinators may be contacted at rrocha@worldbank.org, gbrunner@worldbank.org, or rhinz@worldbank.org.

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Produced by the Research Support Team

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Rein van Dam and Erik Brink Andersen

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Preface

This report is part of a project on risk-based supervision of pension funds coordinated by the Financial Sector Operations and Policy Department of the World Bank, and initiated in response to a growing number of requests from member countries for assistance in the area of pension supervision. The project is being implemented in collaboration with the International Organization of Pension Supervisors (IOPS), and involves the identification of good practices in risk-based supervision of pension funds, based on a number of carefully selected country studies. These good practice guides are expected to benefit a large number of supervision agencies in developed and emerging countries, and contribute to a better performance of private pension systems.

The project will draw on the experience learned in countries that have implemented a risk-based supervision approach and apply this knowledge to assist developing countries. Models of risk-based supervision demonstrate benefits to be gained from moving away from a focus on individual transactions and strict compliance with a range of specific rules towards greater awareness of the risk profiles of supervised entities. A risk-based approach provides encouragement to supervised entities to place a greater focus on risk management in their daily operations, and promotes a safer and sounder financial system. It is expected that over time moving to a risk-based approach to supervision will create scope for supervisors to focus resources on areas of highest risk and, over time, result in a more efficient use of supervisory resources.

The Danish case provides a model of risk-based supervision as applied in a voluntary occupational system that has achieved a high degree of coverage through collective agreements. Danish funds operate on a defined contribution basis but offer guarantees that result in defined-benefit type of arrangements. The model demonstrates how the move towards a risk-based supervision can be a gradual process and need not involve the development of an holistic risk rating model. The “traffic light” model provides a stress test which can feed into a broader and more subjective assessment of pension funds. Nevertheless the results are still used to guide the intensity and scope of supervision.

This report is a condensed version of a more detailed analysis of the Danish system undertaken by Rein van Dam and Erik Brink Andersen. Rein Van Dam was formerly the head of pension supervision in the Netherlands. Erik Brink Andersen was formerly at the World Bank. The paper was extensively edited and restructured by Dimitri Vittas, former World Bank staff, and Greg Brunner of the World Bank. Most valuable and insightful comments were provided by Charlotte Moller of the Danish Financial Supervisory Authority (DFSA), Peter Skjødt of the Danish Insurance Association (DIA) and Roberto Rocha of the World Bank. The authors alone are responsible for the documentation, analysis and conclusions of the report, which do not represent the views of the World Bank, the DFSA or the DIA.

I. Introduction

This paper reviews the evolution of risk-based supervision of pension institutions in Denmark. Over the past decade Denmark has been strengthening its regulatory framework and moving towards the development of risk-based supervision. Unlike some other countries, Denmark has not released a comprehensive model for assessing the risk of its pension funds but it has developed a number of building blocks which it uses for a risk-based assessment of its pension entities. This move towards risk-based supervision has occurred at the same time as Denmark has relaxed its quantitative restrictions on pension fund investments. While this relaxation has opened the way for increased financial returns it has exposed pension institutions to greater volatility and potentially to greater risk of insolvency. Part of the supervisory response has been to introduce a "traffic light" stress testing approach for assessing pension fund solvency. The supervisor is using this information, in conjunction with other measures of a qualitative nature, to determine a rating of each pension institution. It is also using these measures, particularly the stress tests, to guide the intensity and scope of its supervisory activity.

II. The Danish Pension System

1. Description of the System

The Danish pension system is a multi-pillar system. The first pillar is an unfunded social pension scheme that pays a universal flat pension to people over 65 subject to residency and employment earnings tests. The social pension is financed from general tax revenues. In addition to the flat universal pension, a supplement, which is also financed from general tax revenues, is paid to qualifying people subject to an income test.

The second pillar comprises occupational pension plans that are quasi-mandatory and nearly universal. Most have been established by collective labor agreements between employers and labor unions. They are managed by life insurance companies, multi-employer pension funds and corporate pension funds as well as banks. The vast majority of these operate as defined contribution plans. Benefits depend on the size of contributions and investment returns and can take the form of life annuities, phased withdrawals and lump sum payments. Term life and disability insurance is also provided. A major exception to the prevalence of funded defined contribution plans is the civil service pension scheme, which is an unfunded defined benefit plan that is covered from the budget.

The third pillar comprises voluntary personal pension plans. These are offered by life insurance companies and banks. The latter are not permitted to offer insurance products, like annuity contracts but can only provide lump sums and phased withdrawals (as pure savings vehicles, however, limited insurance cover can be obtained as an integral part of the product when a bank cooperates with an insurance company). Third pillar plans are motivated in part by tax considerations and appeal to people who are not covered by occupational pension plans.

In addition to these three pillars, there are a number of statutory supplementary schemes that fall between these pillars. The most important of these is the ATP (Labor Market

Supplementary Pension) scheme, which is a mandatory public scheme, based on individual accounts, fully funded, and financed from employer and employee contributions (or the government for unemployed workers and those on parental leave). Another two schemes are also mandatory and fully funded, while two additional schemes are voluntary and have a much narrower scope. Though established by law and considered public, these schemes follow pure return/risk trade-offs in their investment strategies.

Coverage of the three pillars is very high. It is universal in the public pillar, reaches 80 percent of the labor force under occupational plans (outside the mandated supplementary schemes), and is close to 40 percent in the third pillar. It is estimated that over 90 percent of workers participate in either a second or third pillar plan.

The aggregate assets of the three pension pillars at the end of 2004 amounted to DKK 1,822 billion (€ 244 billion). This corresponded to 125 percent of GDP, up from 83 percent in 1995 (Table 1). The supplementary pension funds (ATP, SP and LD) accounted for 23 percent of total assets, while 77 percent belonged to second and third pillar institutions. The social pension scheme does not have accumulated assets.

Figure 1: Pension Assets

	1995	2000	2004
Total Pension Assets (DKK billion)	847.2	1507.2	1822.1
Total Pension Assets/GDP (%)	83.1%	116.5%	124.8%
ATP (% of total)	15.2%	16.4%	16.9%
SP (% of total)		1.4%	2.5%
LD (% of total)	4.3%	4.1%	3.2%
Life Insurance Companies (% of total)	41.8%	43.1%	44.5%
Multi-Employer Pension Funds (% of total)	17.2%	17.9%	18.6%
Corporate Pension Funds (% of total)	4.0%	2.9%	2.2%
Banks (% of total)	17.5%	14.3%	12.2%

Source: Statistics Denmark and the Danish Financial Supervisory Authority

Total contributions to the supplementary schemes and second and third pillar institutions amounted to DKK 90 billion in 2004 (Table 2). This corresponded to 6.1 percent of GDP, up from 4.3 percent in 1995. Contributions to occupational pension plans absorbed 70 percent of the total and personal pension plans accounted for 22 percent. ATP contributions represented 8 percent of the total. SP contributions absorbed 10 percent in 2000 but were suspended in 2004. The share of occupational pension plans and of life insurance and multi-employer pension funds increased over time.

Figure 2: Pension Contributions

	1995	2000	2004
Total (DKK billion)	44.02	70.91	89.53
% of GDP	4.3%	5.5%	6.1%
ATP (% of total)	10.5%	8.9%	7.5%
SP		9.7%	
Occupational Pension Plans	54.1%	58.6%	70.3%
L&P Institutions	46.4%	52.5%	62.5%
Banks	7.7%	6.1%	7.7%
Personal Pension Plans	35.4%	22.9%	22.3%
L&P Institutions	14.4%	10.1%	9.2%
Banks	20.9%	12.8%	13.1%
Total	100.0%	100.0%	100.0%

Source: Statistics Denmark and the Danish Financial Supervisory Authority

An important characteristic of the Danish pension system is the extensive use of guaranteed minimum benefits in the second and third pillars. Plans operated by insurance and pension companies offer both guaranteed minimum benefits and guaranteed annuity conversion factors in both the second and third pillars, but banks only offer guaranteed minimum investment returns since they are not allowed to offer annuities.

The offer of guaranteed benefits raises some crucial regulatory issues since the value of any guarantees depends on the solvency and integrity of the institution providing them. In Denmark there is no government guarantee fund to absorb the consequences for members of different pension plans if a pension institution were to become insolvent.

The Danish Financial Supervisory Authority (Finanstilsynet), which regulates all types of financial institutions, is responsible for regulating and supervising pension institutions and ensuring that they are in sound financial condition to be able to honor their commitments. The Danish FSA is an institution under the responsibility of the Minister for Economic Affairs. However, the supervision of the various statutory supplementary pension schemes (ATP, SP and LD) comes under the responsibility of the Minister of Labor.

The social pension scheme provides a universal benefit that aims to prevent poverty in old age. Over 700 thousand people were recipients of the social pension in 2003. This corresponded to 13 percent of the total population or 25 percent of the labor force. The total cost of the social pension absorbed 4.4 percent of GDP in 2003, corresponding to 7.5 percent of the wage bill. The average benefit amounted to 30 percent of the average wage. However, these figures include the pension supplements paid to lower-income

pensioners. The basic social pension, without any supplements, amounted to only 20 percent of the average wage.

Although there is no legal obligation on employers to provide pension benefits to their employees, most employers offer such benefits on the basis of collective labor agreements. Coverage expanded considerably in the late 1980s and early 1990s as a result of collective bargaining and political support through the offer of tax incentives. Coverage reaches almost 80 percent of wage earners.

The vast majority of occupational pension plans are defined contribution plans, but they also offer death and disability benefits. However, probably because of the strong involvement of labor unions in their creation and expansion, most schemes offer guaranteed investment benefits and also involve the use of group annuities.

Contributions to occupational pension plans increased steadily over the past ten years from 2.36 percent in 1995 to 4.31 percent in 2004. This increase is due partly to expanding coverage and partly to a gradually rising contribution rate which reached 11 percent in 2006 in labor agreements between the Danish Confederation of Trade Unions (LO) and the Danish Employers' Confederation (DA) that cover half the labor force.

Three main types of institution participate in the second pillar. At the end of 2004, there were 44 corporate pension funds, 30 multi-employer industry-wide pension funds, and 37 life insurance companies. Banks play a small part in the second pillar. Despite the large number of participants, the sector is highly concentrated.

Corporate or single-employer pension funds cover the employees of single companies. They play a small and declining part. Many of them are actually run-off schemes, having been closed to new members and even to new contributions. Multi-employer pension funds are created as member-owned mutual companies and cover industry-wide plans, such as for example nurses. Life insurance companies are the most important group of pension institutions. They are established either as shareholder-owned joint-stock companies or as policyholder-owned mutual companies. Insurance companies typically manage employer-specific plans, which are negotiated with the employers concerned and cover all people employed by them. Although they have different ownership structures, multi-employer pension funds and life insurance companies are subject to identical accounting, reporting and other regulatory rules and there is fierce competition among them.

In the case of occupational pension plans, 50 percent of contributions were allocated to annuities in 2004. The sub-allocation between life and term annuities is not known. However, the 2004 pattern represented a relative decline in the importance of annuities, which absorbed 60 percent of contributions in 1995. Allocations for phased withdrawals, which usually run for 10 years (i.e. they are not lifelong products), absorbed an increasing proportion of total contributions. They rose from 10 percent in 1995 to 35 percent of total contributions in 2004. In contrast, contributions allocated to lump sum payments fell from 30 to 15 percent of the total. To a large extent this reflected changes in tax legislation in 1999 that limited the tax deductibility of contributions to lump sums up to a 43 percent marginal tax rate instead of the top marginal rate of 58 percent.

A relatively recent feature of the Danish pension industry is the offer of unit-linked contracts. This has been prompted by the reduction in guaranteed investment returns and a growing preference of plan members to invest in assets with varying risk/return profiles. However, the proportion of annual contributions that is allocated to unit-linked products is still small, at less than 9 percent of the total. Moreover, unit-linked products often involve some minimum guarantees, usually at a low level compared to traditional products.

A distinguishing feature of Danish pension plans is the offer of guaranteed minimum investment returns for both the accumulation and payout phases. The minimum guarantees are effectively embedded options that members and policy holders have the right to exercise if market rates fall below the guaranteed rates. Pension institutions create appropriate reserves to cover the guaranteed benefits and then distribute bonuses to members depending on the performance of their funds.

The interest rate that was used to calculate the value of guaranteed benefits was initially set at 4.5 percent per year. It was reduced to 2.5 percent in 1994 and further to 1.5 percent in 1999. The new rates apply to new contracts. New contributions made to old contracts are subject to their original guaranteed rates. However, such contributions are not unlimited but are subject to rules specified in the relevant plans or contracts. The setting of guaranteed minimum returns has largely reflected movements in market rates, especially the yields on ten-year government bonds.

Personal pension plans constitute the third pillar of the Danish pension system. They are offered by banks and insurance companies and are established on a voluntary basis by persons who are not covered by occupational pension schemes or wish to obtain additional coverage. As in most countries, they benefit from tax advantages that emulate the fiscal benefits conferred on occupational pension schemes.

Banks play a bigger part in personal pension plans than in second pillar plans, accounting for nearly 60 percent of total contributions. The relative greater success of banks in personal pension plans may be explained by their stronger presence in the retail financial services market and the preference of savers for greater flexibility. Only 15 percent of contributions are allocated to annuities. Unit-linked product (sometimes guaranteed against negative returns) are growing yet comprise less than 10 per cent.

Several statutory schemes have been created over time to supplement the benefits provided by the social pension scheme and/or to attain particular objectives of social and economic policy. The **ATP (Labor Market Supplementary Pension) Scheme** was introduced in 1964 to supplement the social pension. Coverage of ATP increased rapidly over the years and is now near universal. Payments depend on the type of employment. Wages earners contribute one third and employers two thirds. Benefits are also subject to a low ceiling. Benefits take the form of annuities, calculated at an interest rate of 2 percent, but with the possibility of bonus payments from accumulated investment reserves.

The limited role played by ATP is highlighted by the size of contributions and benefits relative to GDP. These respectively amounted to 0.45 and 0.33 percent of GDP in 2004. Total contributions are less than 0.8 percent of the wage bill. However, because of its universal coverage and long existence, the ATP has amassed large assets, amounting to

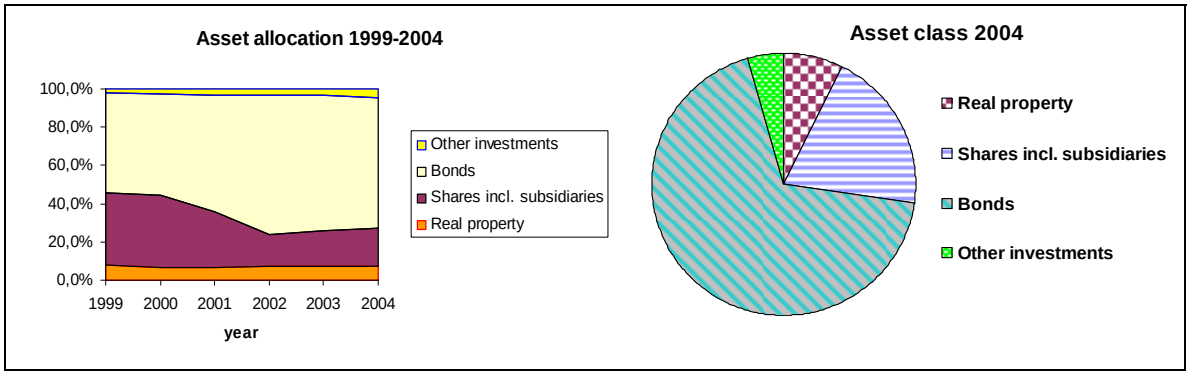
DKK 307 billion (€ 41 billion) in 2004. It is one of the largest financial institutions in Denmark.

The second supplementary scheme, introduced in 1977, is **the LD scheme**. Contributions to this scheme were paid into individual accounts as a trade off for wage increases. The LD scheme has not received any contributions or new members since 1980.

The third supplementary scheme, the **SP (Special Savings Pension) Scheme,** was introduced in 1998 with a view to dampening economic activity and increasing savings. Contributions to the SP were suspended for 2004 and 2005 and the suspension was later extended to 2007.

Pension institutions used to invest heavily in Danish bonds, especially Danish mortgage bonds that enjoyed a higher yield over government paper while being considered as highly safe. However, in the 1990s, following a liberalization of investment rules, pension institutions expanded their investments in equities, especially foreign equities. In 2000 the average asset allocation included nearly 40 percent in equities, while pension institutions with a high solvency ratio were allowed to increase their allocation to equities to up to 70 percent.

Figure 3: Asset Allocation



Source: Danish Financial Supervisory Authority

Following the collapse of equity prices between 2000 and 2002, the equity allocation was substantially reduced, both as a result of changes in relative prices (equity prices fell while bond prices rose in response to the substantial decline of interest rates) and as a result of portfolio reallocation strategies. Pension institutions were required by the regulators to hedge their long-term risks and many proceeded to invest in derivatives, especially interest rate swaps, in order to hedge their liabilities against further declines in interest rates. At the end of 2004, 68 percent of total assets were invested in bonds, 20 percent in equities, 7.5 percent in real estate and 4.5 percent in other assets.

Table 1: Investment returns of pension institutions 1999-2004

€ billion or %	1999	2000	2001	2002	2003	2004
Return on investment	16.6	6.6	-1.4	1.5	8.8	14.2
Result after tax	3.2	0.6	-2.1	-1.4	1.9	2.2
Return on property	8.8%	8.1%	12.8%	12.1%	7.2%	12.0%
Return on equities	40.1%	4.3%	-15.6%	-27.4%	20.9%	13.3%
Return on bonds	1.7%	6.4%	6.9%	11.1%	5.3%	8.7%
Return on total assets	12.9%	5.7%	-1.6%	1.5%	7.8%	7.8%

Source: Danish FSA, Market Development for Insurance Companies and Pension Funds

Many of the larger pension institutions developed sophisticated internal asset management and risk control units. These set annual investment strategies and conduct detailed Asset Liability Management (ALM) analyses. A growing number of pension institutions outsource their portfolio management to external asset managers, while small pension funds often purchase group pension contracts. 14 percent of multi-employer pension funds and one-third of company pension funds are fully reinsured with life insurance companies.

Tax factors have played an important role in stimulating the growth of pension saving. Employee contributions to an occupational pension scheme are deductible from taxable income, with some limitations for lump sum contributions. Employer contributions are also tax deductible. The net tax subsidy in Denmark is around the average for OECD countries, but the high marginal income tax rate of up to 58 percent provides a strong incentive for tax-deductible contributions.

The taxation of investment income has changed substantially over the years. When introduced in 1984 taxation was imposed on real returns above 3.5 percent earned on investments in bonds. This provided incentives for allocating assets into (domestic) equities and real estate, the returns on which were left untaxed.

The taxation of investment income was changed in 1998 when a tax of 26 percent was applied on all income from bonds and real estate, while investment income from equities was subject to a lower tax of only 5 percent. The tax system was streamlined in 2001 when all investment income, irrespective of type of asset, was made subject to a 15 percent tax.

2. Risk Sharing

As already noted, a distinguishing feature of Danish pension plans is the offer of guaranteed minimum investment returns for both the accumulation and payout phases.

Pension contracts are for the most part based on profit participation policies. The guaranteed minimum returns are low relative to prevailing returns at the time the contracts are created. Total returns and pension benefits depend on the realization and distribution of bonuses during the life of the contracts, which often also cover the payout phase and not just the accumulation phase.

The distribution of bonuses is based on the so-called contribution principle to avoid unjustified and distorting transfers across different groups of members and between members of pension plans and the owners of the institutions managing the plans. The parameters of the contribution principle are set by each institution and reported to the DFSA, which has the power to review and disallow them, if it finds them unfair or imprudent.

The return to capital normally consists of a return related to the result plus a "fair" risk premium. In strong financial years, life insurance companies that are set up as joint-stock companies can, in addition to the yearly dividend, pay the owners a dividend compensating for "shortfalls" in earlier, weaker, financial years. Those "fair" but not paid out dividends will normally be accumulated in a "shadow account" in bad years and be paid out in years when financial results are sufficiently strong to cover past shortfalls in the compensation of capital. This is a controversial way of handling "fair" payment to capital. It is not seen in many companies outside the Danish pension sector[1].

III. Motivations for a Risk-Based Approach

1. Insolvency and Rescue Operations in the 1990s

In the early 1990s, the Danish FSA engaged in "rescue operations" for a number of banks involving the transfer of assets to stronger banks. Despite the avoidance of depositor losses the DFSA was criticized for allowing such problems to develop. The DFSA recognized that expectations were that it not only enforce legal compliance but that it also take preventative action to prevent problems from emerging.

These considerations led to a growing emphasis on risk-based supervision as a means for ensuring that financial institutions maintained capital and reserves that were commensurate with the risks they assumed. Risk-based supervision was also promoted as a means for identifying individual institutions that were likely to face solvency problems.

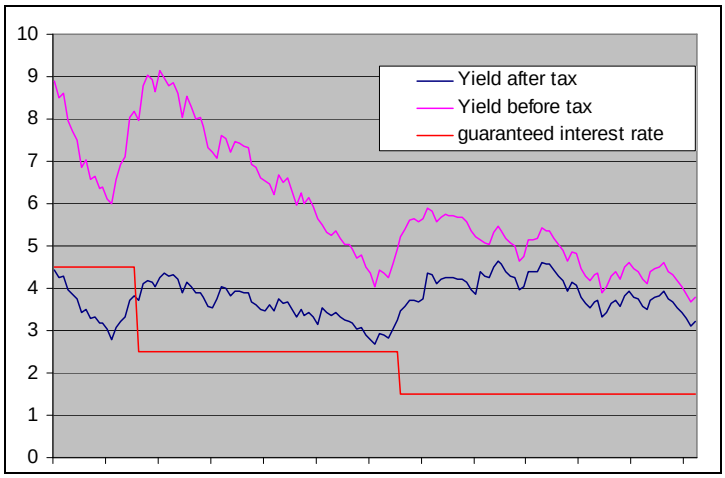
The early use of a risk-based approach for pension institutions was also encouraged by the fact that the Danish FSA combined supervision of all financial institutions, including banks and insurance companies.

2. Growing Concerns about Future Solvency of Pension Institutions

Back in 1984 the maximum technical discount rate was set at 4.5 percent, and most of the policies issued on the basis of the new mutual common calculations explicitly contained a guaranteed minimum nominal interest rate of 4.5 percent after tax. With a nominal interest rate level above 20 percent at that time, the market looked at the guaranteed interest as a technicality. An option with no value as it was deep out of the money. As already noted, due to market developments the maximum discount rate, which also acted as the guaranteed minimum rate, was decreased to 2.5 percent in 1994 and 1.5 percent in 1999.

[1] See Danish FSA – Pension Market Council's report about fair return to capital, 2004 & Danish FSA –return on capital in the L&P industries and the guaranteed return to capital owners.

Figure 4 10 Year Government Bond Yields and Guaranteed Interest Rates



Source: Bloomberg, Danish FSA and Tax Authorities (Told & Skat)

Although pension funds offer guaranteed rates of return these rates have, but for a brief period in the early 1990's been well below market interest rates. However the narrowing gap between guaranteed interest rates and markets rates in the late 1990's and the fact that earlier guarantees must be honored highlighted risks inherent in providing interest rate guarantees that were neither priced nor hedged.

The need to become more risk focused was underscored by the collapse of equity prices between 2000 and 2002 and the substantial fall in interest rates.

IV. Adaptation of Regulatory Framework

Adaptation of the regulatory framework to the risk-based approach involved a gradual increase in the effectiveness of the powers of the supervisor and changes in the rules regarding the licensing, governance, financial management, disclosure and supervision of pension institutions. The trend toward risk-based regulation and supervision started in the late 1980s with the creation of the DFSA and accelerated over the 1990s in response to the financial difficulties faced by banks and pension institutions**.**

1. The Danish Financial Supervisory Authority (DFSA)

The Danish FSA (Finanstilsynet) is the main supervisor of the financial sector, including the pension sector. In its present form, the DFSA was established on 1 January 1988 when the Supervisory Authority for Banks and Savings Banks and the Insurance Supervisory Authority were merged. In January 1990, the Supervisory Authority for Mortgage Credit Institutions was also transferred to the DFSA from the Danish Housing Agency, creating an integrated supervisory authority for the entire financial sector.

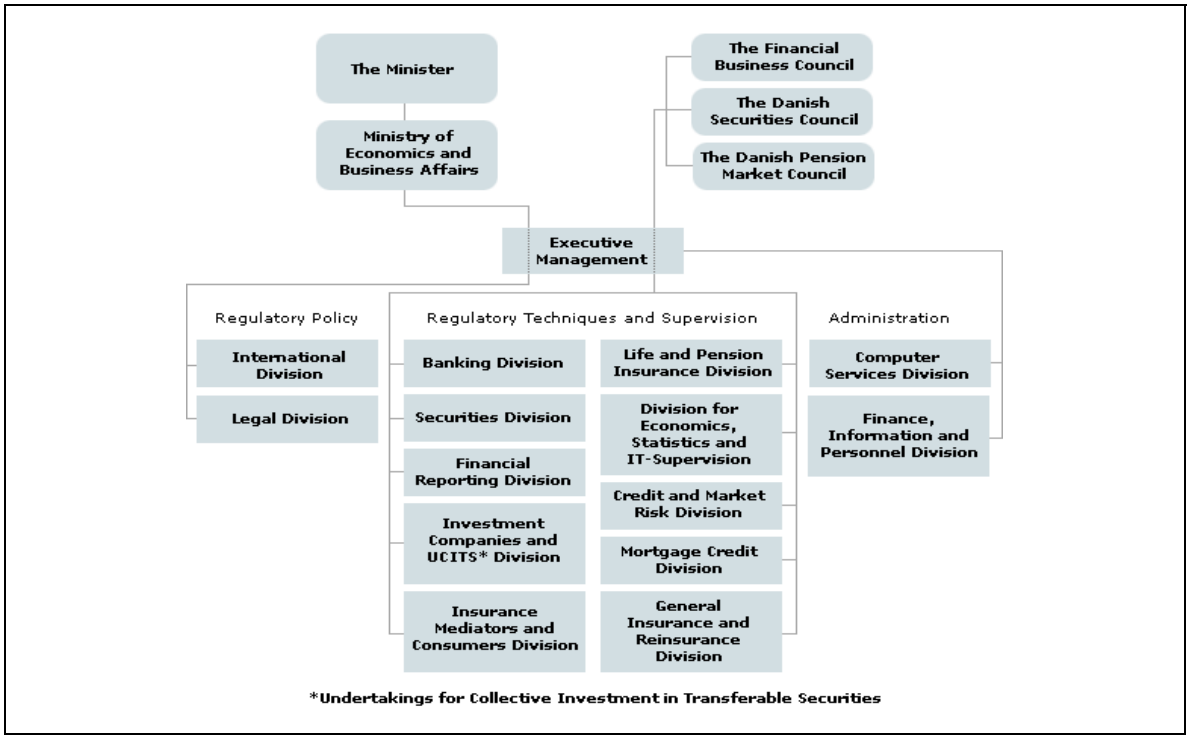
The main objective of the DFSA is to maintain confidence in the stability and efficiency of the financial sector by regulation, supervision and dissemination of information. Apart from the registration and review of the articles of association of new companies, which are carried out by the Danish Commerce and Companies Agency, the Danish FSA is

responsible for supervising compliance of all financial institutions with the Financial Business Act and regulations pursuant to that Act.

The collection and dissemination of information plays a critical part in the operations of the DFSA. The DFSA uses the collected information to evaluate the financial strength and performance of individual institutions and to identify institutions that require close monitoring and early remedial action. Published information aims to support management, clients and investors in evaluating the risk profile and efficiency of each financial institution.

The DFSA is accountable to the *Minister of Economic Affairs*, who has overall political responsibility in matters relating to the financial sector. The DFSA is supported in its activities by three councils: the *Financial Business Council, the Danish Pension Market Council and the Danish Securities Council.*

Figure 5: Regulatory Structure



Source: Danish Financial Supervisory Authority

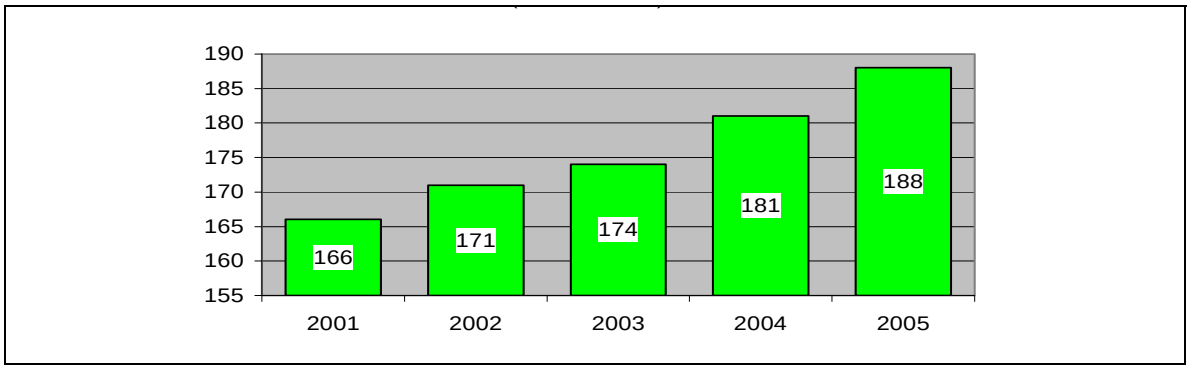
The DFSA has a four member management board, 14 divisions, and a number of special counselors. The Director General is in charge of the work of the management team and is responsible to ministers and councils. He holds the overall responsibility for strategic planning and resource allocation.

Regulatory Techniques and Supervision has 130 staff representing about 70 percent of total resources. Within this area 14 staff is employed in the Life and Pension Insurance Division. They take part in supervisory work, such as off-site surveillance (desk research) and on-site inspections. They are also involved in several supervisory research activities.

In the development of the traffic light stress test the Life and Pension Insurance Division was supported by other divisions, including the Banking Division with its superior expertise in this area.

The Credit and Market Risk Division informs pension supervisors on the evaluation of credit and market risks and the Mortgage Credit Division informs about real estate risks. The Insurance Mediators and Consumers Division is responsible for supervising the fitness and probity of the boards of directors and management of pension institutions.

Figure 6 Staff of the Danish FSA (fte)



Source: Danish Financial Supervisory Authority

Internal procedures of the supervisor have been formalized through the development of supervision manuals and written internal procedures related to the most important legal tasks. The procedures for the application of the traffic light system have also been stipulated in detail in internal manuals. The traffic light system is seen as the starting point of important discussions on risks instead of a rigid capital adequacy test.

The budget of the DFSA is covered by fees from regulated entities based both on gross premiums and member contributions, and on the size of the balance sheet less base capital. The budget of the DFSA amounted in 2004 to about € 18 million. 18 percent was contributed by pension institutions, 49 percent by banks, and the rest by other financial institutions.

2. Licensing and Authorization Criteria

All financial institutions are required to obtain an authorization from the DFSA according to current EU directives. An application must be accompanied by various documents, including a memorandum of association and a business plan. The technical basis (i.e. framework for setting premiums, provisioning and profit-sharing) for insurance must be added if the application is for a life insurance and pension license. The supervisor may refuse to approve the technical basis.

The application must specify the types of pension products the applicant intends to offer, the basis for calculating and adjusting pension contributions, benefits and technical provisions, the rules for the distribution of profits, losses and administration costs, the policy on reinsurance, the rules on the information that members must provide for an

assessment of risks, the rules on transfers of accounts and policies, and the rules that apply in cases of transfer of ownership or reorganization of an undertaking.

Appointment of members of the board of directors and the board of management is subject to a "fit and proper" test.

3. Governance Rules and Internal Controls

A range of conduct of business rules designed to avoid conflicts of interest and ensure appropriate governance arrangements are prescribed in the Financial Business Act. These are supplemented by guidelines issued by the DFSA for insurance and pension entities. In the guideline for insurance companies[2], the DFSA requires that policies must reflect the risk profile and capital strength of the entity. The guideline is in accordance with standards prepared by the International Association of Insurance Supervisors (IAIS).

Among other things the standard operating procedures and the internal controls of the pension institution must ensure sufficient segregation of personnel (segregation of duties) and that the undertaking does not become too dependent on individual key persons. If complete segregation of duties is not possible, this must be taken into account in the preparation of guidelines and procedures and in the planning of internal controls.

In conjunction with the board of management, the board of directors carries out the management of the undertaking. The board of directors must ensure that the overall management tasks are given appropriate attention. The guidelines of the board should include a description of the pension institution’s risk profile. The board needs to issue instructions setting out limits for risk taking that enable the organization to implement the policies.

A pension institution is required as a minimum to prepare guidelines that contain information about the following: the insurance function; the types of insurance that may be written, acceptance rules, tariffs, etc.; the reinsurance cover including choice of reinsurance, requirements, etc.; investment policies and objectives; registration of assets; and information and communication to customers.

Reporting to the board of directors must include all the areas for which limits for the board of management have been laid down or where legislation stipulates limits.

The board of directors must lay down targets and standards of reference for the purpose of assessment of results achieved, including the returns obtained. It must also carry out an annual review of the principles for the measurement and valuation of assets and of the risk situation of the insurance function with a view to an assessment of the need for amended guidelines for risk assumption, adaptation of tariffs or provision principles.

If the assets of the pension institution are managed by portfolio managers, it is the responsibility of the board of directors that funds are invested within the guidelines and in accordance with the Financial Business Act. In addition, directors have the responsibility to ensure that reporting procedures are adequate and suitable for complying with the guidelines and the law.

[2] Guidelines for Insurance Undertakings pursuant to section 71(1), nos. 1-3 of the Financial Business Act.

4. Actuarial and Auditing Rules

The requirements for a responsible (appointed) actuary are set down in the Financial Business Act. The responsible actuary must ensure that the pension institution complies with its technical basis. The responsible actuary is required to notify immediately the DFSA of any disregard of these conditions.

The DFSA has laid down more detailed provisions in an executive order on the conditions, including the requirements that a person must fulfill in order to be employed as the responsible actuary, e.g., requirements regarding education and operational experience.

Large pension funds are expected to have an internal audit function. In addition, all pension institutions must also have at least one external auditor, who is a state-authorized public accountant. The auditor is required to comment on the adequacy of provisions and risk management procedures.

External auditors and chief internal auditors are required to notify the DFSA of any matters of material importance for the continued operation of the pension institution, including matters which may be observed by the auditors while performing their audit in undertakings with which the pension institution is closely linked.

The DFSA can order auditors to cover specific areas for individual companies or for the pension sector, can request meetings with auditors and has the right to dismiss them, although it has yet to exercise this right. The DFSA has laid down additional provisions on audit proceedings[3].

5. Capital Rules

The Danish solvency rules are similar to the regulations of the European Life Directive, which has not yet imposed risk-based capital requirements. The DFSA imposes some additional rules related to the traffic light system which are described in Section 5.

6. Technical Provisions and Valuation Rules

Pension institutions must create sufficient technical provisions, including mathematical provisions, in respect of their entire business. The technical rules for the valuation of assets and liabilities, the recognition of revenues and expenses, and the calculation of technical provisions are covered by guidelines issued by the DFSA.

In accordance with the European Life Directive, technical provisions must be calculated by a sufficiently prudent and prospective actuarial valuation, taking into account all future liabilities, as determined by the policy conditions, for each existing contract and scheme. They should include all guaranteed benefits, including guaranteed surrender values, all collective and individual bonuses to which policy holders are entitled, all options available to policy holders under the terms of their contracts, all expenses, including commissions, and credits for future premiums due.

[3] Executive Order on Auditing Financial Undertakings and Financial Groups

In Danish practice the technical (pension) provisions are divided into three components: guaranteed pension and insurance benefits; bonus potential related to future premiums; and bonus potential related to benefits on paid premiums.

7. Investment Regulations

Pension institutions in Denmark are subject to some quantitative restrictions on their investments. Since 2000 greater investment freedom has been permitted in conjunction with the introduction of the traffic light system. This is a stress test for a fair assessment of the solvency of the companies and a tool for intervening as early as possible if the solvency of a company is in danger because of a high risk profile. The traffic light system is discussed in Section 5. Thus, while the quantitative approach has been retained in form, because it is more in line with the approach followed by the EU Life Directive, in substance the regulation of investment policies has been moved in the direction of adopting the "prudent person" rule that is prevalent in Anglo-American countries.

8. Distribution Rules

A distinguishing feature of the Danish pension system is the widespread use of profit participation policies and the offer of guaranteed minimum investment returns for both the accumulation and payout phases. The guaranteed minimum returns are low relative to prevailing returns at the time the contracts are created and thus total returns and pension benefits depend on the realization and distribution of bonuses during the life of the contracts. The rules for the distribution of bonuses play a central part in the functioning of the system.

Risk-sharing schemes help institutions cope with volatility and solvency problems, but could result in substantial, unintended, and unfair income transfers across different groups of policy holders and between policy holders as a group and the owners of the institutions managing the plans. To avoid such unjustified and distorting transfers, the authorities have required pension institutions to stipulate in their contracts with customers their distribution principles. The so-called contribution principle reflects the opinion of the DFSA. The distribution parameters are set by each institution and reported and justified to the DFSA, which has the power to review and disallow them, if it finds them unfair or imprudent.

The contribution principle consists of two elements. The first element relates to the distribution between the owners of the company and the policy holders as a group ("the calculated contribution principle"). The owners have contributed with own funds, which may be shareholder capital or so-called Special Bonus Provisions (policy holder funds which under certain requirements fulfill the role of capital, i.e. the provisions that form part of the capital covering the solvency margin). Consequently the owners are entitled to a share of income corresponding to the capital they have invested.

Income is not divided proportionally between the amounts “invested” by policyholders and shareholders respectively. It is accepted that there is an added mark-up to the part allocated to shareholders as a payment for the risk taken by share capital. Some distributions to own funds are only permitted if sufficient surpluses are available. Payments can be deferred until results permit. Thus, in strong financial years, pension institutions that are set up as joint-stock companies can, in addition to the yearly

dividend, pay the owners a dividend compensating for “shortfalls” in earlier, weaker, financial years.

The measurement principle used for assets is crucial for the determination of the realized result. The use of fair values means that all value changes on assets are reflected in the realized result and must be divided between policyholders and owners. There are no hidden values serving to cushion the volatility of financial markets in the accounts and in the realized results.

The second element is the "distributed contribution principle" according to which policy holders are entitled to a share of the income generated that corresponds to the premiums they have paid and the accumulated interest and bonuses that have been added to the premiums in the course of the contracts. But policy holders have different contracts with different terms. The amounts allocated to individual policyholders do not necessarily correspond exactly to the amounts relating to individual contracts, but reflect the different risks associated with specific types of contracts. In relation to the distributed contribution principle, the executive order implies that "redistribution of significant financial amounts shall not take place between insurance contracts, beyond the amounts following from the coverage of risks included in the insurance contracts".

The companies have discretion regarding the timing of the allocation to individual contracts. They can retain the bonuses to a certain extent for prudential reasons, but this prudential consideration should be balanced toward the principle that bonuses should be released to individual policy holders in the course of the contract in a way that ensures a fair distribution between policy holders with different characteristics.

The allocation of bonuses to policyholders follows the rules set for the creation of technical provisions. When the provisions for guaranteed benefits, bonus potential for future premiums, and bonus potential for paid premiums have been set, any remaining allocation to policyholders is posted on the collective bonus potential.

When results in a particular year are negative, the deficit that is attributed to policyholders is covered in reverse order. If the negative results cannot be covered by deductions from these provisions or from the company's own funds and special bonus provisions, the responsible actuary must immediately notify the DFSA.

9. Disclosure Rules

To enhance transparency and facilitate more informed decisions, pension institutions are required to disclose in their annual accounts key figures and ratios regarding investment returns, costs, risks and capital strength. In addition, the DFSA publishes on its website key performance indicators of individual institutions as well as of the two sub-sectors of life insurance companies and multi-employer pension funds.

10. Off-Site Analysis and On-Site Inspections

The DFSA conducts regular off-site examinations of the financial data submitted by regulated institutions and reviews the results of their operations. Pension institutions must provide the DFSA all necessary information for the performance of its duties. Nearly all financial information is made available in electronic form. The DFSA is entitled to gain access to the premises of pension institutions at any time without warrant in order to

conduct inspections or gather information, although a three-week notice will be given under normal circumstances.

Pension institutions must publish an annual report comprising a management endorsement, a balance sheet, an income statement, notes including a description of accounting policies and movements in own funds, a management review and finally the auditors' opinion. All assets and liabilities must be measured at fair value.

The annual report must be audited by the external auditors and submitted to the DFSA no later than 4 months after the end of the accounting year.

The audit books from the external auditor and from the chief internal auditor (for pension institutions with internal auditors) must be submitted to the DFSA at the same time as the annual report.

The DFSA may lay down regulations on the preparation and publication of interim statements covering shorter periods than the annual report. At present, every institution is required to submit semi-annual unaudited reports. However, the majority of pension institutions issue quarterly performance reports on a voluntary basis.

Where a member of the board of directors, board of management, external auditor, or responsible actuary of a company has cause to believe that the pension company does not comply with the capital requirement he/she must immediately notify the supervisor.

External auditors and chief internal auditors must also immediately notify the DFSA of matters which are of importance to the continued operation of the undertaking, including matters which may be observed by the auditors while performing their audit in entities with which the pension institution is closely linked.

Regular on-site inspections normally include meetings with senior management, responsible actuary, head of investments, head of IT systems, and internal and external auditors.

As on-site inspections are relatively more expensive and resource intensive compared to off-site analysis, inspections are primarily conducted in cases where it is difficult to prepare or evaluate reports – or when there is doubt as to the reliability of a report.

However, smaller companies are subject to regular on-site inspections at least once in every seven years and larger companies at least once in every four years. For companies in the green traffic light zone, the frequency of off-site inspections within these time limits is based on the opinion of the supervisor on the importance and probability of qualitative risks in the relevant institution. But when the traffic light system shows a red or yellow light the institutions concerned will be visited more frequently.

The DFSA may as mentioned above gain access to the premises of an institution at all times with a view to obtaining information, including during inspections. The DFSA may ask for any information, including accounts, accounting records, printouts of books, other business records, and electronically stored data deemed necessary for its activities or for deciding whether a natural or legal person is covered by the provisions of this Act.

The DFSA may order the management of an institution to prepare an account of the financial circumstances and future prospects of the undertaking. The board of directors, board of management, the responsible actuary, the external auditor and the chief internal

auditor shall confirm that they have been made aware of the contents of the order issued by the DFSA by signing it.

Pension institutions are required to submit all the necessary data for assessing their financial resilience in accordance with the traffic light system. They are also required to report on a regular semi-annual basis the results of internally conducted stress tests.

11. Enforcement

In case of poor management of the board, or in the event of non-compliance with the Law, several sanctions can be used. The most powerful sanctions are replacement of the management board and withdrawal of authorization. Fines are also possible. In gross or repeated offences, the cases will also be reported to the police. The most important sanctions include the following:

The DFSA may order a company not to accept or to remove a member of the board of management within a specified time limit, if the member does not meet the fit and proper test.

If the technical basis of premiums, provisions and profit-sharing principles is deemed inadequate, the DFSA is empowered to order the pension institution to carry out the necessary changes in the conditions within a specified time limit.

The DFSA may order a pension institution to take all the necessary measures within a specified limited time frame if its financial position has deteriorated to such a degree that the interests of pensioners and other insured parties are at risk or if there is a significant risk that the financial position will develop so that the institution may lose its license. If the base capital is not sufficient, the DFSA will require the institution to draw up a plan for restoration of its financial position. The DFSA will assess whether the plan contains the necessary measures.

Pension institutions must carry out annual reviews of their pension rules and technical basis and must inform the DFSA of whether changes are required, when they submit their annual financial statement. If the DFSA finds that changes are required, it shall ensure that the company carries out adjustments.

Violation of several provisions of the Financial Business Act is liable to a fine. In some circumstances imprisonment of no more than four months can be an alternative.

Where a company, or a responsible person within the company, omits to fulfill the duties and obligations imposed under the Act (such as failing to give information), the DFSA may, as a coercive measure, impose daily or weekly fines on said undertaking as such or on the persons responsible for said undertaking.

The DFSA may withdraw the license of a pension institution fully or partly, if it is guilty of gross or repeated violations of provisions laid down in the Financial Business Act, it no longer fulfils the conditions for a license, it does not, within the time limits set by the DFSA, carry out the measures listed in the restoration plan, its management fails the "fit and proper" test, it is committing other serious or repeated offences or the pension institution itself requests it.

The Financial Business Act also contains special regulations regarding the appointment of administrators in the case of bankruptcy, or where pensioners are deemed at risk. Decisions made by the DFSA may be appealed to the Danish Commerce and Companies Appeal Board.

V. Implementation of Risk-Based Supervision

Denmark is a member of the European Union and its legislation for solvency, accounting, and freedom of services across borders follows the provisions of EU directives. However, as a general principle, EU directives set minimum rules, but leave ample room for detailed provisions to be determined by national authorities.

The regulation of life insurance companies and pension funds is based on the EU Life Directives. The solvency rules stipulated by the directive are not yet risk based. On the asset side, quantitative limits apply. There are restrictions on the proportion of assets that can be placed in "risky assets", notably equities. Moreover, quantitative limits are applied to the possible exposure to one issuer of securities or to the proportion of total assets, which may be invested in just one company or a group of closely related companies. These rules aim at limiting an imprudent concentration of risks. However, the solvency rules do not take into account the level of risk of different assets. Thus, institutions with substantially different risk profiles are subject to the same solvency requirement.

The Danish authorities have been taking various steps in gradually moving in the direction of a risk-based approach to the regulation and supervision of pension institutions. This move has been accompanied by a freeing up of some regulations and a view that the greater flexibility given to pension entities could increase their risk profile.

1. Relaxation of Investment Limits

In 2000 the limits for investment in equity (so called “risky assets”) was raised from 50 percent to 70 percent. This increase was accompanied by a requirement that the proportion of “**r**isky assets” in a portfolio be assessed against objective criteria based upon an assessment of the company's actual capital strength measured against its risks on investments and commitments.

The flexibility in the current investment regulations is so great that asset allocation strategies are more influenced by internal asset/liability considerations and capital rules (like the traffic light system) than by investment rules and limitations per se.

2. Gradual Adoption of Fair Value Accounting Rules for Assets

Fair value accounting has been introduced gradually since 1995. Since 2003 all assets of pension institutions must be measured and reported at fair values with value changes - realized and unrealized - shown in the profit and loss account.

3. Adoption of Fair Value Accounting Rules for Liabilities

The Danish authorities established in 1998 a special Market Value Committee to propose a suitable model for the valuation of insurance and pension liabilities. The committee included representatives from the DFSA, which held the chairmanship, the life insurance

industry and the actuarial and accounting professions. The committee reached consensus on a valuation model that was based on the decomposition of technical provisions and the ultimate adoption of the yield curve of appropriate zero-coupon instruments.

4. Decomposition of Technical Provisions

The decomposition of technical provisions reflects two important aspects of the Danish pension market: the offer of guaranteed minimum returns on both past and future contributions (premiums); and the presence of contracts with substantially different guaranteed rates. The new rules on the setting up of technical provisions require pension institutions to use three different components of technical provisions for each generation of contracts.

- The *guaranteed benefits* measure the difference between the market (present) value of the guaranteed benefits according to the terms of the insurance contract and the market (present) value of the future premiums to be paid.
- The *bonus potential on future premiums* measures the market (present) value of the excess return over the guaranteed benefits, which will arise from the future premiums. This bonus potential is calculated as the difference between the market value of the guaranteed benefits on premiums paid and the market value of the guaranteed benefits. If this difference turns out to be negative, it is set at zero.
- The *bonus potential on premiums paid* measures the market value of the excess return over the guaranteed benefits which arise on premiums which have already been paid. This bonus potential is calculated as the difference between the technical provisions and the guaranteed benefits on paid up premiums. If this difference turns out to be negative, it is set at zero.

The sum of guaranteed benefits, bonus potential on future premiums and bonus potential on paid premiums constitute the technical provisions, which form the base for calculating the solvency requirement. Pension institutions also set aside under the contribution principle that governs their with-profits policies a *collective bonus, which* represents the value of bonuses allocated to policyholders as a group, but which has not yet been allocated to individual policyholders. The collective bonus is not a part of the technical provisions and is, therefore, not taken into account in the computation of the solvency margin.

When measuring the components of technical provisions the accounting rules state that assumptions must be based on the best estimate of relevant underwriting risks, administration costs, and an appropriate discount rate with the use of a risk margin. Hence, technical liabilities must be reported at their best estimate. There are no general actuarial assumptions that are stipulated by the DFSA. Pension institutions must base measurement of their liabilities on their best estimates, taking into account any future projected developments.

One important assumption when measuring technical liabilities is the assumption about mortality. The DFSA does not stipulate any mortality table to be used. Each pension institution must base its liabilities on its own best estimates on future mortality and longevity - however, the best estimate assumption is subject to review by the supervisor.

5. Adoption of Zero-Coupon Yield Curve

Since January 2005 the DFSA has been publishing on a daily basis a yield curve of Euro swap rates to use in valuing the present value of cash flows., During a long transition period, pension institutions will continue to have the option to use either a flat rate or the yield curve, but from the beginning of 2009, use of the yield curve will be compulsory.

VI. The Traffic Light System

The traffic lights system was introduced by the DFSA in 2001. The aim was to ensure that companies hold sufficient reserves to cover possible adverse market developments. The requirements were imposed on all life insurance companies and pension funds, not only those exceeding the former quantitative limit (50 per cent) on the share of risky assets.

The stress test is divided into two scenarios: Yellow Test and Red Test. When a company does not fall into one of these two categories, it is deemed to be in a green light situation; hence its capital base is adequate when measured against its potential to absorb losses from possible adverse market developments.

Both tests measure the capital strength against scenarios which are possible, but which have not occurred at the time the stress is performed. Measurement and reporting is done every half year. The yellow scenario is possible, but less likely, whereas the red scenario is more likely (though still it is only a plausible scenario). The colors indicate that it is a serious matter if the plausible scenario poses capital problems (red light), whereas it is a less serious problem if the less likely scenario (yellow light) poses capital problems.

The stress test is composed of a number of assumed market developments which are outlined below.

1. Asset Risks

Debt Instruments

The interest rate risk is calculated by the market value of the asset multiplied by the modified duration and multiplied by the change in the interest rate. The assumed interest rate changes are shown in the following table.

Table 2 Interest rate risk

Duration	Red Test	Yellow Test
Short Duration < 1y	Up/down 1.0% point	up/down 1.43% point
Medium Duration 1y< <3.6y	**up/down 0.85% point**	**Up/down 1.18% point**
Long Duration 3.6y <	up/down 0.7% point	up/down 1.0% point

The results of the stress test are reported in the form of the following table.

Figure 7: Interest Rate Risk: Interest Bearing Receivables – RG 03

DKr mln.	Market value	Red		Yellow	
		Interest fall	Interest increase	Interest fall	Interest increase
Nominal bonds					
1. - duration ≤ 1y					
2. - 1y <duration ≤ 3.6y					
3. - duration > 3.6y					
4. Indexed bonds					
5. Mortgage and commercial bonds					
6. Derivatives					
7. Total					

2. Equity and Real Estate Risks

In the Red Test equity prices are assumed to fall by 12 per cent. This is the same rate used under Basel I for banks for calculating capital requirements. In the Yellow Test equity prices fall by 30 per cent, a rate of decrease that has long been used by insurance actuaries in many countries. Real estate properties are measured at market value according to accounting standards. In the Red Test real estate market values are assumed to fall by 8 percent and in the Yellow Test by 12 percent.

Table 3 Equity and Real Estate Risks

Equity Prices	Decline by 12 percent	Decline by 30 percent
	Decline by 8 percent	Decline by 12 percent

The results of the stress test on equity values are reported in risk report RG05 and those on real estate values in risk report RG07.

Figure 8: Market Risk on Equities – RG 05

DKr mln.	Market value	Red	Yellow
1. Equities			
2. Derivatives			
3. Total			

3. Credit Risk

The credit risk is measured by applying credit risk weights on the different categories of bonds and reported in risk report RG08. Government bonds are assigned a weight of 0. Supra and Agency bonds are assigned weights between 0.10 and 0.01563 depending on class and duration. Corporate bonds are assigned a weight of 1. The same weights are used for both the red and yellow scenarios. The total credit risk is 8 percent of the weighted amount.

It is important to note that the credit risk on corporate and mortgage bonds does not yet take into account the risk of default as reflected in different credit ratings. As the traffic light system evolves toward a fuller application of risk-based rules, the applied risk weights will need to reflect the investment grade of corporate and mortgage bonds.

Figure 9: Credit and Counterpart Risk – Credit Risk RG 08

DKr mln.	Unweighted amount	Weight	Weighted amount
1. Government bonds		0,0	
Mortgage loans			
2. - remaining term < 6 months		0,01563	
3. - 6 months ≤ remaining term ≤ 24 months		0,0625	
4. - remaining term > 24 months		0,1	
Other claims on banks and such			
5. - remaining term < 6 months		0,03125	
6. - 6 months ≤ remaining term ≤ 24 months		0,125	
7. - remaining term > 24 months		0,2	
8. Remaining claims		1,0	
9. Total			
10. Total credit risk (weighted total amount multiplied by 0,08)			

4. Counterpart Risks on Derivatives

The counterpart risks on derivatives are calculated by using the market value multiplied by a weight depending on the type and duration of contracts and by a factor [*a*]that depends on the credit risk classification of the security issuer.

Figure 10: Credit and Counterpart Risk – Counterpart Risk RG 08

DKr mln.	Unweighted amount	Weight	Weighted amount
11. Positive market value of entered contracts		0,2 ·a	
Underlying principal amount: Interest contracts			
12. - remaining term < 1 year		0,0	
13. - 1 year ≤ remaining term ≤ 5 years		0,001 ·a	
14. - remaining term > 5 years		0,003 ·a	
Currency contracts			
15. - remaining term < 1 year		0,002 ·a	
16. - 1 year ≤ remaining term ≤ 5 years		0,01 ·a	
17. - remaining term > 5 years		0,015 ·a	
Shares			
18. - remaining term < 1 year		0,012 ·a	
19. - 1 year ≤ remaining term ≤ 5 years		0,016 ·a	
20. - remaining term > 5 years		0,02 ·a	
21. Total			
22. Total credit risk (weighted total amount multiplied by 0,08)			

5. Risks in Subsidiary Companies

Risks in subsidiary companies are calculated with the same procedure as the parent company.

6. Taxation (Tax Assets)

The profits of the year are taxed at a 15 percent rate according to the Danish Pension Yield Tax Act. A loss in the current year is deductible in the following year, and thereby creates the possibility of a tax asset.

7. Currency Risks

All uncovered positions in foreign currencies are measured with Value at Risk (VaR) on a 99 percent level for the Red Test and 99.5 percent for the Yellow Test.

8. Liability Risks (Insurance Provisions)

The liabilities are treated differently from the assets. The discount rate is assumed only to move in parallel shifts, where the rate used is the zero coupon rate from the Euro swap curve. Since short rates are more volatile than long rates, this approach does not take into account the higher volatility of liabilities of short duration. The change in the interest rate in the Red Test is up/down 0.7 percentage points and in the Yellow Test up/down 1.0 percentage point. However, a non-parallel shift will be applied on a voluntary basis after July 2006 and as a requirement from 2009. The risks in liabilities (Insurance Provisions) are defined as the difference between before and after stress testing and are reported in risk report RG04.

Figure 11: Interest Rate Risk on Technical Provisions – RG 04

DKK mln.			Red		Yellow	
	Portfolio	Provision	Decrease	Increase	Decrease	Increase
1.	Guaranteed benefits					
2.	Bonus Potential on Paid up Premiums					
3.	Bonus Potential on Future Premiums					
4.	Assumed probability of surrenders					
5.	Guaranteed benefits					
6.	Bonus Potential on Paid up Premiums					
7.	Bonus Potential on Future Premiums					
8.	Assumed probability of surrenders					
9.	Guaranteed benefits					
10.	Bonus Potential on Paid up Premiums					
11.	Bonus Potential on Future Premiums					
12.	Assumed probability of surrenders					
			Red		Yellow	
13.	Total: Guaranteed benefits					
14.	Total: Bonus Potential on PuP					
15.	Total: Bonus Potential on FP					

9. Basic Information and First Summary

The total impact of the stress tests is obtained by taking into account the worst result from either an increase or decrease in stress parameters in the Red and Yellow Tests. A first summary is generated that is reported as risk report RG02.

Figure 12: Basic Information – RG 02

DKr mln.	
1. Balance	
2. Required solvency before stress test	
3. Capital bases before stress test	
4. Collective bonuspotential before stress test	
5. Contribution multiplier *	
Part of the available bonus potential to be applied to cover losses in	
6. - red scenario in case of an interest decrease	%
7. - red scenario in case of an interest increase	%
8. - yellow scenario in case of an interest decrease	%
9. - yellow scenario in case of an interest increase	%
10. Tax percentage	15%
* Contribution multiplier: determines the percentage of asset loss covered by the collective bonus potential	

10. Concluding Report

The above summary is used as the basis for calculating the impact of the stress tests on the excess capital base of pension institutions. This is completed after allowing for the distribution of risks (losses) between policyholders and owners in accordance with the

contribution principle. The conclusion on the impact of the stress test is reported on a half-yearly basis in risk report RG01.

Figure 13: Conclusion – RG 01

DKr mln.		Red	Yellow
1. Worst scenario on interest rates		< decr./incr. >	< decr./incr. >
2. Interest rate risk -assets-		< +/- 70 bp >	< +/- 100 bp >
3. Equity risk		< -12% >	< -30% >
4. Currency risk		< VaR 99% >	< VaR 99,5% >
5. Real property risk		< -8% >	< -12% >
6. Credit and counterparty risk		< 8% of r.w.a.* >	< 8% of r.w.a.* >
7. Subsidiary company risk		< see note** >	< see note** >
8. Total asset risk			
9. Intrest risk on technical provisions		<+/- 70 bp>	< +/- 100 bp >
10. (only for non-life)			
11. Capital base post scenario			
12. Solvency margin post scenario	-		
13. 3% of technical provision	+		
14. Over-absorption	=		
15. Collective bonuspotential post scenario			
16. Bonus potential on Paid up Premiums post scenario			
17. Risk adjusted solvency ratio			
18. Company is in the …. zone		red / yellow / green	

* Risk Weighted Assets
** The effect on the (parent) capital base of an identical scenario in the subsidiary company

The required solvency margin (row 12) is based on the EU Life Directives, which include a solvency margin for the investment risks borne by pension institutions (4 percent of assets). As the investment risk is explicitly addressed in stress tests, the required solvency margin is reduced by adding back 3 percent of technical provisions (the difference between 4 percent that is required when the investment risk is borne by the pension institution and 1 percent when it is not, as is the case for unit-linked business). The allocation of losses to the collective bonus and the bonus potential on paid premiums is then calculated according to the terms of the underlying contracts before obtaining the net risk adjusted solvency ratio.

After receiving the final conclusion report from the pension institutions the DFSA takes into account some further information on qualitative risks as well as longevity risk in order to develop a more comprehensive and true picture of the situation of each pension institution.

11. Internal Risk Control and Market Discipline

In addition to the use of the traffic light system, there has been a growing emphasis on the adequacy of internal risk control systems (solvency II) and greater reliance on market discipline. These do not represent specific initiatives of the DFSA but reflect a growing trend in most advanced countries. Nevertheless, they play a central part in the evolving risk-based approach to supervision as they address qualitative risks that are difficult to

quantify, while also allowing a swifter retribution by market participants on institutions that fail to maintain adequate standards.

The importance that is attached to internal risk control systems and market discipline reflects the evolution of thinking on banking supervision under Basel II. The DFSA has focused a substantial part of its supervisory effort in assessing the qualitative risks faced by pension institutions. These cover the adequacy of internal risk control systems, the presence of staff with the requisite expertise, and the institution of procedures for proper reporting to the highest levels of management. The DFSA has an internal rating system for each pension institution. However, there is no formal requirement for pension institutions to appoint a chief risk officer reporting to the CEO and the Board. Qualitative risks also cover exposure to operational, IT, legal, integrity and even underwriting risks, all of which are not quantified either under the current solvency regime or the traffic light system. A failure in one or other of these areas has often been the proximate cause of collapse and insolvency of financial institutions.

The DFSA is paying particular attention to the development of internal risk models that allow pension institutions to determine their risk exposures and measure the impact of changes in financial market conditions on their capital and solvency. It has also developed three internal quality scores on organization, procedures and internal controls as well as a rating on insurance risks, which mainly covers the longevity risk exposure of different institutions. The insurance risk is determined by considering a 1 percent increase in longevity. These qualitative scores are added to the quantitative scores resulting from the stress tests of the traffic light system.

The DFSA is also attaching significant importance to greater publication of data on the financial performance and standing of pension institutions. Greater disclosure is expected to strengthen market discipline. Public disclosure of risks, costs and returns is likely to enhance efficiency by allowing investors, policy holders and other market participants, including competing institutions, to make better informed decisions on their transactions with individual pension institutions.

12. Changes in DFSA Procedures and Skills

The introduction of fair value accounting and the traffic light system was not only challenging for the industry, but also for the DFSA. Monitoring the actuarial and auditing reports of pension institutions during *off-site* surveillance has become more important because of the traffic light system. The compilation of more detailed data by pension institutions has alleviated the data collection effort that the DFSA needed to undertake in the past. On the other hand, greater importance needs to be attached on educating DFSA staff in understanding the models used by pension institutions, drawing appropriate inferences from the submitted data regarding the risk exposure and solvency of individual institutions, and determining the actions that the DFSA needs to undertake to remedy any problems.

The focus of on-site inspections has also changed. Greater emphasis in now placed on verifying that adequate internal risk control systems and standard operating procedures are in place rather than verifying compliance with specific DFSA rules. The introduction of the traffic light system has not required an increase in the number and frequency of on-

site inspections. But the results of stress tests have guided the intensity and scope of on-site inspections.

During the last few years great effort has been devoted to enhancing the education of DFSA staff. An internal “supervision school” has been created to deepen knowledge of fair value accounting and the traffic light system and even more important to change the attitude of staff from assessing compliance with regulatory rules to recognizing and acting on foreseeable risks.

Staff incentives have also been changed. Job rotation, especially between the banking and the insurance and pension division is encouraged, while bonuses for senior management depend, among other factors, on the progress in implementing risk-based supervision in their department. DFSA staff is part of the public sector and this creates problems in attracting able and experienced professionals. The intensive internal training effort aims to complement the external hiring initiatives.

Remedial actions depend on the results of the traffic light system, off-site analysis and on-site inspections. If a pension institution passes all tests, it is given a "green light" under the traffic light system, which implies that the risk of insolvency and withdrawal of authorization is very low. This institution is then subject to regular monitoring, semi-annual submission of stress test and other statistical reports. On-site inspections are carried out on a regular basis or "at random" to keep the institution alert.

Failure to meet the yellow scenario is treated as an early warning indicator. An institution that receives a yellow light is placed under intensified supervision, with quarterly stress test and other reports and more frequent and intensive on-site inspections. The DFSA may also order an (extraordinary) audit. The primary goal of intensified supervision is to increase the risk awareness of the management of the pension institution concerned.

When an institution receives a red light, it may be subjected to more drastic intervention. The DFSA may order the institution concerned to take the measures necessary within a specified time limit if its financial position has deteriorated to such a degree that it puts the interests of policy holders and other affected parties[4] at risk. Direct intervention may also be necessary if the institution is close to losing its license.

A red light from a stress test does not necessary imply that the institution will immediately be subject to crisis management. The DFSA is aware that the standard red light is too simple to reflect fully and unambiguously the resilience of an individual institution to possible future risks. This is why the institution is always given the opportunity to argue its case to the DFSA that the red light does not reflect its actual financial condition. But if the DFSA decides that the interests of all interested parties are seriously at risk it will take appropriate and necessary action.

The DFSA will normally require monthly reporting from the institution as well as an undertaking that it will not increase its overall risk exposure. Often, the DFSA will demand a reduction in risks, if the institution remains in red light situation for a prolonged period. Measures to reduce risks and/or risk exposures are not specified in detail. It is left to the management of the institution to decide on the most suitable

[4] The depositors, the insured parties, the bond owners, the investment associations, the special-purpose associations, the restricted associations, other collective investment schemes or other investors.

actions. However, action plans prepared by the institution concerned must be submitted to the DFSA to enable an assessment of their appropriateness.

The most serious cases, when immediate action is required, are those where pension institutions fail to meet the "formal" solvency requirement that is based on European legislation. This is informally known as the "black light". If an institution does not comply with the formal solvency requirement, formal action based on the Financial Business Act has to be taken.

The Act states that if a pension institution's does not comply with the solvency rules, the DFSA must ask the institution to draw up a plan to restore its financial position and assesses the adequacy of the plan. The DFSA decides the maximum period for the restoration of the financial position, depending on the size of the shortfall and anticipated market developments. The DFSA is expected to monitor the performance of the operating plan and demand changes in the plan if the financial position of the institution suffers further deterioration. The DFSA may also require a new operating plan to be submitted covering the following three accounting years. However, if the base capital of the pension institution is less than one third of the solvency requirement or is less than the minimum capital requirement, the period for restoration of capital will be stated in months and will not normally exceed one year. The capital shortfall may be covered by reserves of different types of bonuses and the base capital. The institution may also decide to increase member contributions or attract new external shareholder capital.

13. Changes in the Behavior of Pension Institutions

The gradual introduction of risk-based supervision induced, as was intended, various changes in the behavior and management practices of pension institutions. However, these changes also represented a necessary response by pension institutions to wide-ranging market developments.

Soon after the introduction of stress testing, financial markets were hit by severe turmoil. There was a global collapse of equity prices following the bursting of the dotcom bubble and a simultaneous dramatic fall in interest rates. Pension institutions suffered huge losses on their equity portfolios, while the present value of technical provisions increased dramatically.

In addition, pension institutions were exposed to asymmetric effects of options that were embedded in their balance sheets. A very high proportion of contracts contained guarantees of high returns, both for past and future contributions that must be honored.

The mismatch between assets and liabilities was aggravated by the presence of large investments in mortgage bonds that enjoyed embedded call options. As borrowers exercised their options to refinance their mortgages with lower mortgage rates, pension institutions did not experience an increase in the market value of their bond holdings.

In this situation, a large number of institutions found themselves in the yellow light under the new traffic light system, while some were even in the red light. For a few companies the situation turned out to be so severe that they encountered real problems in fulfilling their solvency requirements and they were placed under special supervision by the authorities.

Pension institutions reacted to the financial crisis and the new stress testing by reducing their equity portfolios (in large part caused by the very fall of equity prices), selling short-duration bonds and buying long-duration ones, especially foreign bonds, and engaging in extensive hedging operations, mostly through the use of long-term interest rate swaps in the more liquid Euro market[5]. Although such policies ran the risk of "locking-in the losses", it was generally accepted that pension institutions could not afford to suffer additional losses and endanger their financial solvency.

Although detailed data were not available to estimate the price effect and separate it from the asset allocation effect, published data support the argument that ATP has engaged in a significant switch away from domestic and foreign equities and domestic bonds and in favor of foreign bonds and derivatives. If there was no quantity effect but only a price effect, the share of equities should have recovered between 2002 and 2004. In fact, the share of equities fell from 40 percent in 1999 to 22 percent in 2002 and continued to fall to less than 18 percent in 2004.

Table 4: Change in Asset Allocation by ATP

	Domestic Bonds	Foreign Bonds	Fixed Income Derivatives	Domestic Equities	Foreign Equities	Investment Trusts	Other Assets
1998	55.0	2.4	0.0	25.2	10.7	1.2	5.5
1999	47.7	3.7	0.0	24.8	15.3	3.3	5.3
2000	39.8	9.7	0.0	21.1	16.4	6.9	6.1
2001	29.1	16.5	0.0	16.8	19.0	12.5	6.1
2002	32.8	27.6	5.3	11.6	9.2	6.0	7.5
2003	29.6	35.1	4.2	11.2	8.6	4.2	7.2
2004	26.1	32.2	10.2	9.6	7.9	7.1	7.0

Source: DFSA and ATP

[5] The response of pension institutions to the financial turmoil and the growing use of derivatives are analyzed in some detail in Ladekarl et al (2006).

Table 5 Change in Asset Allocation of Life Companies and Pension Funds

	Domestic Bonds	Foreign Bonds	Domestic Equities	Foreign Equities	Investment Trusts	Other Assets
1998	54.4	1.3	13.4	12.3	1.9	16.7
1999	46.6	2.1	12.6	18.3	3.5	17.0
2000	44.7	4.8	11.3	18.5	4.6	16.1
2001	45.1	10.7	8.6	12.5	6.3	16.8
2002	53.0	13.6	4.6	6.9	6.2	15.7
2003	51.3	12.4	4.4	8.0	8.1	15.8
2004	43.2	14.6	4.6	8.3	12.3	17.1

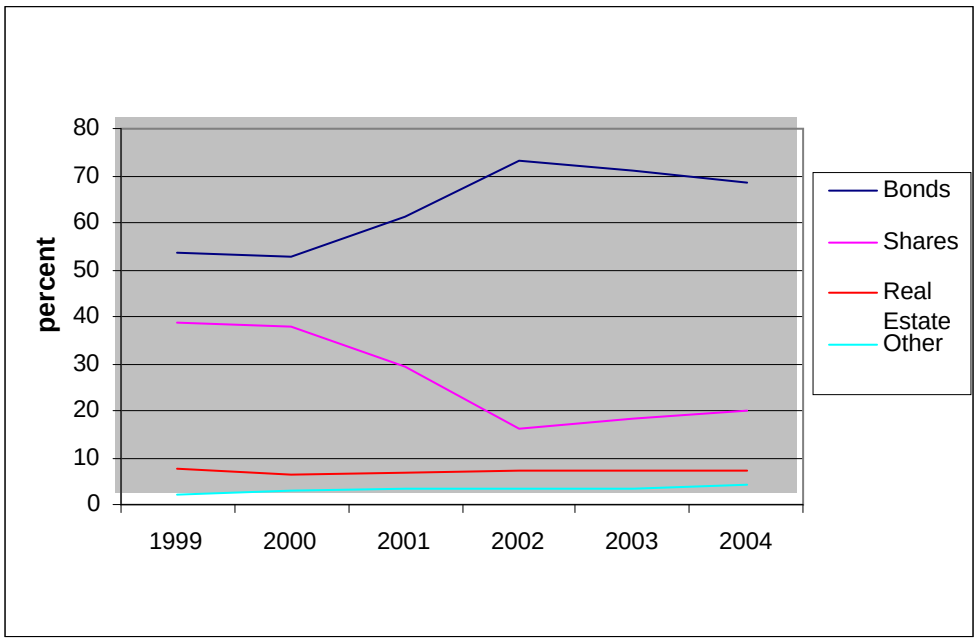
Source: DFSA

For life insurance companies and multi-employer pension funds, the picture is not as sharp but is still quite clear. Holdings of domestic bonds fluctuated from year to year but there was a large increase in holdings of foreign bonds. Holdings of both domestic and foreign equities fell sharply and rose very slightly after the recovery of equity markets in 2003 and 2004, implying a quantity effect was in place, and not just a price effect. However, L&P institutions invested less heavily in equities before 2000 and the impact is smaller. A switch away from equities is also discernible.[6]

The evolution of the asset composition of pension institutions is also shown in the following graph. The supervisory authorities intervened to force remedial action in institutions that were in a red light situation, but refrained from influencing management decisions and forcing asset sales in all other institutions.

[6] Investment trusts invest in both equities and bonds. Other assets include buildings, subsidiaries and loans.

Figure 14 Asset composition in Danish Pension companies



Source: Danish FSA, Market Development for Life-assurance Companies and Nation-wide Pension Funds

The growing use of derivatives and the changes in asset allocation strategies improved the interest sensitivity of the total portfolio. While in 2001 and 2002, an interest rate fall of one percentage point produced a net loss of more than DKK 15 billion, this was transformed into a net gain of DKK 15 billion in 2003 and DKK 8 billion in 2004.

Table 6 Simulation Results of Change in Interest Rates

Year	Change	Liabilities DKK bn	Assets DKK bn	AL Gains DKK bn	Derivatives DKK bn	Net Gains DKK bn
2001	-1%	-65.0	49.4	-15.6		-15.6
2002	-1%	-66.6	26.7	-39.9	25.1	-14.8
2003	-1%	-52.0	40.2	-11.8	26.9	15.1
2004	-1%	-76.1	40.7	-35.4	43.8	8.4

Source: Ladekarl et al, 2006

Other important changes cover developments in product pricing and product innovation. In a market environment that is dominated by with-profits policies, changes in product pricing involve changes in the distribution of profits. Until recently, most institutions set the rate of profit distribution to clients one year ahead. This rate was an important competitive parameter among pension institutions. However, after the financial turmoil, many institutions introduced a variable rate of profit distribution that depended on investment performance during the year. This more flexible approach made it easier for

institutions to meet their obligations, but coupled with the substantial reduction in guaranteed rates of return it created considerable uncertainty in the eyes of policyholders.

Client response to the increased uncertainty stimulated the introduction of unit-linked and other products that were offered without any guarantees or with reduced levels of guarantee. Unit-linked products were accompanied by increased transparency in the distribution of profits between owners and policyholders. In some cases, pension institutions introduced products with highly transparent distribution policies that were based on pre-determined and clearly postulated formulas.

VII. Preliminary Assessment of Risk-Based Supervision

1. Positive Achievements

A fundamental aspect of the Danish experience is the large expansion of pension coverage and the vast accumulation of pension assets that occurred since the mid-1990s. As discussed over 90 percent of Danish workers participate in either an occupational or personal pension plan, while the total assets of pension institutions reached 125 percent of GDP in 2004.

In this context of market success, one of the most important achievements of the supervisory authorities has been the broad acceptance of a risk-based approach to the regulation and supervision of life insurance companies and pension funds. This has been facilitated by the prevalence of with-profits policies with guaranteed minimum investment returns and the pressure faced by all types of pension institutions arising from long decline of interest rates since the early 1990s and the sudden global collapse of equity prices between 2000 and 2002.

A second and equally important achievement has been the gradual re-orientation of the DFSA. Benefiting from its extensive involvement in banking supervision issues, the DFSA has been able to shift from a pre-occupation with compliance with rules to focusing on solvency assessment, identification of asset/liability mismatches, and management of risk exposures.

A third achievement has been the use of pragmatic interventions. The DFSA issued instructions and orders to individual institutions to take necessary remedial action, but refrained from forcing them to sell specific assets. It engaged in extensive consultations with the concerned institutions, but allowed their management to determine their own action plans. The DFSA reviewed these plans to verify their adequacy and monitored their implementation to ensure that corrective measures were effective.

The DFSA played a leading part in the introduction of fair-value accounting, working jointly with industry representatives to analyze the issues and reach consensus on the changes that were deemed necessary. Fair-value accounting was introduced in stages, leaving ample room and time for pension institutions to adapt their procedures and train their staff. This gradualism was another example of pragmatic response to market challenges.

In similar vein, the adoption of a zero-coupon yield curve for discounting future pension liabilities followed close collaboration with industry representatives and allowed individual institutions to comply with the new approach within a reasonable time frame.

The traffic light system was implemented cautiously, although in this case it could have benefited from more extensive consultation with market participants and experts. The traffic light system could have been adapted more effectively to the particularities of pension business but, allowing for the possibility of further improvements and refinements, it was implemented without causing excessive disruption to the operations of pension institutions. The need to take prompt action explains to a large extent the limited extent of consultation.

The growing emphasis on internal risk control systems, enhance transparency, and greater market disciplined has increased risk awareness by pension institutions, while placing responsibility for effective risk management firmly on the boards of directors and boards of management of individual institutions. The rapid development of highly sophisticated internal risk control systems by the larger pension institutions and their use for detailed model simulations lend support to the benefits of this approach.

Pension institutions now have greater awareness of the risks that are embedded in their contracts and are more knowledgeable on how to minimize these risks. They are as a sector less exposed to adverse developments in financial markets and also are better able to adjust to market changes. Their customers are also better informed since pension institutions are now required to make public their sensitivity to major adverse market changes.

Finally, a major achievement has been the gradual change in reserving and investment practices of pension institutions. The new risk management systems have allowed institutions to adopt a better matching of their assets and liabilities, including their exposure to embedded options. Growing use of various types of derivatives, including long-term interest swaps, swaptions (i.e., options to enter into swap contracts), and constant maturity swap floors as well as equity options and futures, has allowed individual institutions to deal effectively with long-standing embedded options that had created asymmetric exposures and interest rate sensitivities.

2. Remaining Challenges

Despite the many positive achievements, there are also several remaining challenges. The first such challenge is the need for further streamlining of the traffic light system. Various technical improvements have already been suggested. They include introduction of a correlation matrix between asset classes, differentiation of risk rating within specific asset classes (e.g., between mature and emerging markets, between large and small capitalization issues, between high and low credit rating bonds, and between listed and unlisted securities), equalization of the stress test parameters of interest rate risk between assets (which are already duration dependent) and liabilities (which are not yet duration dependent), and introduction of sensitivity to underwriting risks, especially longevity and disability risks. Some of these measures have been implemented as from July 2006, while the sensitivity of underwriting risks is reported to the DFSA as supplemental information.

Another challenge concerns the clarification of the legal content of contract guarantees. One of the practical consequences of fair value accounting of assets and liabilities has been that embedded options in pension contracts, such as interest rate guarantees, are now defined in a more precise way. In the past it was not always clear whether the interest rate guarantee applied to an annual minimum yield or to a minimum average yield over the lifespan of the contract. In fact, some cases in relation to this issue are currently disputed in Danish courts. The legal outcome on this issue will have important ramifications for the pension industry. New contracts contain more precisely defined terms on guarantees and embedded options, while the distinction between unconditional provisions and bonus potential has also become clearer.

Another issue is the addition of a "fair" margin for risk and uncertainty to the computation of future cash flows. In the past, a small deduction was applied to the flat discount rate, but in the future a risk margin would be added directly on the estimated cash flows. The risk margin could vary among individual institutions reflecting the nature and structure of their future liabilities.

However, apart from the above important refinements to the traffic light system, Denmark (in line with other EU countries) needs to adapt the legal framework to introduce proper risk-based capital requirements. This is the object of the Solvency II deliberations that have been ongoing for a number of years now and are not likely to be concluded before the end of 2007. Adoption of risk-based capital requirements (expected in 2010) will remove the existing uncertainty regarding the legal force of risk-based supervision, but it is unlikely that it will change fundamentally the current approach of the Danish supervisory authorities.

Following the publication of a report by a government-appointed committee on the merits of greater freedom of choice in pension saving and investment, a working party was created with representatives from the DFSA, the DIA and the Ministry of Economics to consider the introduction of Risk Adjusted Solvency Requirements (RASR) and Individual Capital Assessment (ICA). The report of the working party has not been published yet, but negotiations and discussions between the DFSA and the DIA on the introduction of RASR and ICA are currently under way.

Another important challenge is the need for broad dissemination of analytical data that will permit a more comprehensive and systematic analysis of the performance of pension institutions both on a sector and individual basis. While consumers and workers may find it difficult to utilize the plethora of available data and effectively scrutinize institutional performance, specialized experts can undertake such detailed analyses and publish summaries of the performance of different institutions and products in terms of overall investment returns, operating costs, distribution of bonuses, solvency soundness, and other characteristics. Availability of detailed data would permit in-dept econometric and financial studies of the efficiency, soundness and fairness of the whole pension industry.

At present, claims are often made that fierce competition among pension institutions stimulates innovation and efficiency. However, retail markets are not responsive to even large differences in performance. Simple reliance on abstract claims about the intensity of competition is not sufficient to buttress the view that the pension system meets the fundamental challenges of efficiency, stability and fairness. Claims on performance and

efficiency need to be supported by rigorous empirical studies and financial investigations by independent specialists.

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