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# Pension Institutions and Annuities in Denmark

*Carsten Andersen*

*Peter Skjodt*

The World Bank  
Financial Systems Department  
Financial Policy Division  
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## Abstract

This paper considers the overall structure of the Danish pension system, reviews the relative role of different types of pension institutions, and discusses their asset allocation strategies and investment performance. The paper also examines the regulation and supervision of providers of pension services, the growing reliance on risk-based supervision, and the application of the so-called contribution principle.

The Danish pension system includes a modest universal social pension with a supplement for low-income pensioners and near universal participation in occupational and personal pensions that are primarily based on defined contribution plans. The annuity market is well developed: 50 percent of annual contributions

are allocated to the purchase of deferred annuities, while immediate annuities are also purchased at or even after retirement. However, detailed comprehensive data on the rate of annuitization are lacking.

Distinct features of the Danish pension system include the widespread use of profit participating contracts with minimum guaranteed benefits and regular provision of bonuses, covering both the accumulation and payout phases, and extensive use of group deferred annuity contracts. A new traffic light system with periodic stress testing has resulted in greater emphasis on asset liability matching and hedging strategies by pension institutions and a shift in investment policies in favor of foreign bonds and long-term swap contracts.

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This paper—a product of the Financial Policy Division, Financial Systems Department—is part of a larger effort in the department to contribute to the research on the payout phase of defined contribution pension systems. Policy Research Working Papers are also posted on the Web at <http://econ.worldbank.org>. The program manager of the project may be contacted at [rrocha@worldbank.org](mailto:rrocha@worldbank.org).

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# **Pension Institutions and Annuities in Denmark**

**Carsten Andersen and Peter Skjodt<sup>1</sup>**

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<sup>1</sup> Danish Insurance Association. The authors are grateful to Erik Andersen, Roberto Rocha and Dimitri Vittas for comments on earlier drafts.

## PREFACE

This paper on the Danish annuities market is part of a broader project on annuities, coordinated by Roberto Rocha, program manager in the unit for Financial Markets for the Social Safety Net, of the Financial and Private Sector Development Vice-Presidency of the World Bank. The project was initiated in 2004 to contribute to the research on the payout phase of defined contribution pension systems. Many countries that have implemented systemic pension reforms and introduced private pension systems operating on a defined contribution basis are now facing the challenge of organizing the payout phase for retiring workers. Organizing the payout phase entails introducing a well-regulated market for retirement products, which involves the effective regulation and supervision of retirement products, marketing activities, and intermediaries. However, the literature on the payout phase is generally focused on a few countries and topics, and does not address in sufficient detail the institutional and regulatory issues faced by policy-makers in reforming countries.

The World Bank project fills this gap by reviewing in detail a number of representative country cases, including Australia, Chile, Denmark, Sweden, and Switzerland. These countries have large private pension systems operating primarily on a defined contribution basis and have already entered the payout phase. Moreover, their institutional and regulatory arrangements for the payout phase are different in many aspects, including decentralized and centralized arrangements for the provision of annuities, different menus of retirement products, different approaches to price regulation and risk-sharing, different marketing rules, and different capital rules for providers. Therefore these countries provide a rich variety of experiences and policy lessons for other reforming countries.

Denmark has a large mandatory second pillar that operates on a defined contribution base, although with benefit guarantees, and has achieved a high degree of annuitization in the payout phase. The provision of annuities is decentralized, as in countries like Chile and Switzerland, with many corporate pension funds and insurance companies offering annuities and phased withdrawals. One of the main characteristics of the Danish system is the risk-sharing/profit-sharing arrangement comprising the accumulation and payout phases. The arrangement involves the payments of bonuses above the guaranteed benefit, when the conditions allow such payments. This arrangement has some attractive features, especially regarding the solvency of providers. However, it also requires reasonably complex rules to avoid unfair and unintended transfers of income across different stakeholders.

The paper was prepared by Carsten Andersen and Peter Skjødt, of the Danish Insurance Association. Jannik Andersen contributed to the writing of Chapter II. The paper benefited from the inputs of Erik Brink Andersen, Roberto Rocha, and Dimitri Vittas. Dimitri Vittas also played a key role in revising and editing parts of the paper. The authors alone are responsible for the documentation, analysis and conclusions of the report, which do not represent the views of the Danish Insurance Association.

## Table of Contents

I. Introduction .....	1
II. Structure of the Danish Pension System .....	4
A. Public Pension Schemes.....	4
Social Pension.....	4
ATP (Labor Market Supplementary Pension Scheme).....	5
B. Occupational Pensions .....	6
Non-Statutory Occupational Pension Plans .....	7
Statutory Supplementary Schemes .....	11
C. Personal Pensions.....	12
D. Asset Accumulation and Investment Performance .....	13
E. Market Concentration.....	18
F. Retirement Products.....	19
G. Risk-Sharing Characteristics.....	21
H. Replacement Ratios.....	23
III. Regulation and Supervision .....	27
A. Overview .....	27
B. Solvency Rules, Investment Rules and Stress Testing.....	28
C. Register of Assets Covering Technical Provisions .....	29
D. Valuation Rules - Assets .....	30
E. The Prevalence of With-Profits Contracts.....	30
F. Use of the Contribution Principle.....	32
G. Valuation Rules - Liabilities .....	34
Decomposition of Technical Provisions .....	34
Assumptions Governing Technical Provisions.....	35
H. Market-Value Accounting Rules - Some Examples .....	36
Effects of Changes in the Market Interest Rate .....	38
Effects of Changes in Equity Prices.....	40
I. Guidance on Market Discipline.....	42
J. Evaluation of Experience with Guidance on Market Discipline.....	44
K. Market Values and the Choice of Discount Rate.....	46
Introduction of a Yield Curve.....	47
L. Treatment of Risk and Uncertainty .....	49
M. The Traffic Light System .....	49
Asset Risks.....	50
Currency Risk .....	50
Risks in Subsidiary Companies .....	51
Risks Associated with Real Estate Properties.....	51
Taxation (Tax Assets).....	51
Liability Risks (Insurance Provisions).....	51
Calculation of the excess Capital Base is made in the following order:.....	51
N. Evaluating the Traffic Light System.....	51
O. Risk-Based Capital Requirements .....	53
IV. Efficiency of Risk Sharing Arrangements .....	55
A. Introduction.....	55

B. Risks Faced by Active Workers and Pensioners .....	55
C. Risks Faced by Pension Institutions .....	57
D. Risks Faced by Government .....	59
V. Conclusions and Lessons for Other Countries .....	62

Table 1 Social Pension: Demographic and Economic Data, 1990-2003 .....	4
Table 2 ATP Coverage, Contributions and Benefits .....	6
Table 3 Contributions to Occupational Pension Plans, 1995-2004 .....	8
Table 4 SP Coverage, Contributions and Benefits.....	11
Table 5 Contributions to Personal Pension Plans, 1995-2004.....	13
Table 6 Pension Assets .....	14
Table 7 Asset Composition.....	15
Table 8 Investment Returns .....	16
Table 9 Administrative Expense Ratios (Percent of Average Assets).....	17
Table 10 Investment Expense Ratios (Percent of Average Assets).....	17
Table 11 Total Operating Expense Ratios (Percent of Average Assets) .....	17
Table 12 Average Disposable Income of Pensioners, 2000 and 2045.....	24
Table 13 Contributions to personal and occupational pension schemes in 2003 by Income Group .....	26

Figure 1 Evolution of Old Age Dependency Ratio.....	5
Figure 2 Evolution of Contribution Rate .....	9
Figure 3 Participation in Occupational Pension Plans by Age Group, 2003 .....	9
Figure 4 Guaranteed Interest Rates and After-Tax Yield-to-Maturity on a 10-year Government Bond, 1988-2005.....	11
Figure 5 Market Concentration.....	19
Figure 6 Average expected replacement ratios for different groups of education in 2000 and 2045.....	24
Figure 7 Calculated Replacement Ratios.....	25
Figure 8 The Insurance Contract.....	37
Figure 9 Balance Sheet Under the Old and the New Accounting System.....	37
Figure 10 Starting Point .....	38
Figure 11 Interest Rate Decrease .....	39
Figure 12 Interest Rate Increase .....	40
Figure 13 Balance Sheet After Stocks Fall by 20 percent .....	41
Figure 14 Balance Sheet After Stocks Fall by 40 percent .....	41

## I. INTRODUCTION

Like most OECD countries, the Danish pension system has a multi-pillar structure with a high level of complexity. The public pillar comprises both flat and earnings-related benefits. At the core of the public pillar, and of the whole system, the social pension scheme pays benefits to people over 65. The social pension is unfunded and is financed from general tax revenues (i.e. a pay-as-you-go system). It consists of two parts: a flat universal pension that is subject to a residency test and proportionality rule as well as an employment earnings test and a supplement that is paid to qualifying people subject to an income test.

The public pillar also has a smaller component that is fully funded, is financed from employer and employee contributions (or the government for unemployed workers and those on parental leave, etc.), and operates as a defined contribution plan. This is known as ATP (Labor Market Supplementary Pension). Despite being fully funded and based on individual accounts, ATP is classified as a first pillar scheme by most Danish pension experts because it was established by law and entails social security features.

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 on a small scale. The vast majority of these operate as defined contribution plans. An exception is one of the pension schemes for certain civil servants, which is an unfunded tax-financed defined benefit plan.

The second pillar also includes three supplementary pension schemes that have been created on an ad hoc basis. They are operated as defined contribution plans, are fully funded, and two of them are managed by ATP while the last is managed by LD Pensions. They are classified as second pillar schemes, because they entail a more direct link between the capitalization of plan contributions and benefits.

The third pillar comprises voluntary personal pension plans. These are created by life insurance and pension companies as well as banking institutions. The latter are not permitted to offer annuity products but can only provide lump sums and phased withdrawals. Third pillar plans are to some extent motivated by tax considerations and appeal to people who are not covered by occupational pension plans as well as to people who wish to supplement their pillar II savings.

Coverage of the three pillars is very high. It is universal or nearly universal in the public pillar components, almost 80 percent of wage earners under occupational schemes (outside the mandated supplementary schemes), and 40 percent of wage earners in the third pillar. Overall, more than 90 percent of wage earners participate in either an occupational pension scheme or a third pillar plan. These figures applied for 2003 only. This means that people not contributing in 2003, for example because of temporary

unemployment, were not included. Taking more years into account shows a higher coverage and provides a more realistic picture of overall coverage. A study concerning occupational pension schemes in the period 1995-2000 shows that 93 percent earned the right to an occupational pension in at least one year of the period. This figure compares to the 80 percent in 2003 only.<sup>2</sup>

Another characteristic of the Danish pension system is the extensive use of guaranteed minimum benefits in the second and third pillars. Plans operated by insurance companies and multi-employer pension funds offer both guaranteed minimum investment returns and guaranteed annuity conversion factors in both the second and third pillars. Banks do not offer guaranteed minimum investment returns and are not allowed to offer annuities.

The use of guaranteed benefits in occupational pension plans has been promoted by the active involvement of labor unions in collective bargaining and a strong emphasis on risk sharing arrangements that aim to protect retiring workers from large fluctuations in investment returns. The use of guaranteed annuity conversion factors involves the use of group annuities that reduce the occurrence of adverse selection in the decision to annuitize and lower the cost of annuities.

Like the pension systems of most economically advanced and demographically mature countries, the Danish pension system faces a number of important policy challenges. The first is the impact of the rapid aging of Danish society on the sustainability of the level of promised benefits. The second challenge concerns the financial security of guaranteed benefits, an issue that is linked to the efficiency of risk management and the appropriateness of the risk sharing arrangements used in Denmark. A third challenge is the effectiveness of regulation and supervision and its contribution toward adopting adequate risk management practices.

The main objective of this paper is to assess the adequacy and efficiency of risk sharing arrangements and risk management practices in the Danish pension and annuity market. Chapter II considers the overall structure of the pension system and reviews the relative role of different pension institutions. It also discusses the asset allocation and investment performance of different institutions and reviews the types of retirement products that are offered in Denmark. Chapter III focuses on the regulation and supervision of providers of pension services. It places particular emphasis on the growing reliance on risk-based supervision and the application of the so-called contribution principle. Chapter IV assesses the efficiency of risk sharing arrangements in Denmark. Risk sharing plays a significant role in the Danish pension system, but it raises challenging policy issues concerning equity and sustainability. The last chapter offers some concluding remarks.

The analysis has been constrained by the difficulty of calculating Money's Worth Ratios (MWRs) for the different types of annuities. Because the Danish system relies extensively on the allocation and distribution of bonuses, calculation of MWRs would

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<sup>2</sup> The study was carried out by The Ministry of Economic and Business Affairs in the report "Increased Freedom of Choice in Pension Saving", May 2003.



require a large quantity of data on both projected (ex ante) and declared (ex post) bonuses.

## II. STRUCTURE OF THE DANISH PENSION SYSTEM

### A. Public Pension Schemes

These cover two schemes that are administered by public sector institutions and aim to provide universal or near-universal benefits. As already noted, the main scheme is unfunded and financed from general tax revenues, but the main supplementary scheme is financed from employer and employee contributions and is fully funded.

#### Social Pension

Denmark was one of the first countries to introduce a public retirement pension system more than 100 years ago. It originally targeted the “worthy needy”, but has over time expanded to become a universal scheme. The social pension is paid to citizens and non-citizens, who are over 65 years old, subject to a residency test and proportionality rule. It is also subject to an earnings-from-employment test and is reduced according to specified rules. In addition to the flat pension, a supplement is paid to low-income pensioners subject to an income test.

Over 700,000 people were recipients of the social pension in 2003 (Table 1). This corresponded to 13 percent of the total population or 25 percent of the labor force. The average benefit amounted to 30 percent of the average wage or 33 percent of per capita income. The total cost of the social pension absorbed 4.4 percent of GDP in 2003, corresponding to 7.5 percent of the wage bill. However, these figures include pension supplements paid to low-income pensioners. The basic social pension, without any supplements, amounted to only 20 percent of the average wage.

**Table 1 Social Pension: Demographic and Economic Data, 1990-2003**

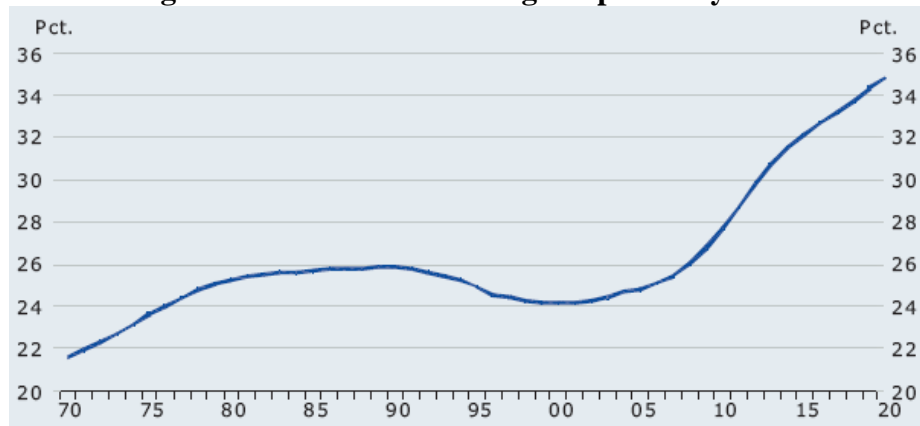
	1990	1995	2000	2003
Pensioners (000s)	706	709	706	717
Pensioners/Total Population (%)	13.7	13.5	13.2	13.3
Pensioners/Labor Force (%)	24.3	24.7	24.4	25.1
Total Social Pensions (DKK billion)	35.51	51.20	55.45	61.57
Total Social Pensions/GDP (%)	4.2	5.0	4.3	4.4
Total Social Pensions/Wage Bill (%)	7.0	8.5	7.5	7.5
Total Social Pensions/Public Expend. (%)	7.6	8.4	7.9	8.0
Social Pension/Average Wage (%)	28.7	34.6	30.8	29.8
Social Pension/Per Capita Income (%)	30.8	37.2	32.5	33.1

Source: Statistics Denmark

The social pension represents by design a much higher proportion of income for low income groups that also have shorter periods of education. Available evidence shows that it represents more than 60 percent of the income of unskilled retired workers, about 40 percent for skilled retired workers, and less than 20 percent for more highly educated workers.

The projected aging of the Danish population is expected to raise substantially the cost of the social pension scheme (Figure 1). According to official projections, the cost will rise to 6.5 percent of GDP in 2020 and 7.8 percent in 2037 (Ministry of Social Affairs). If the wage bill continues to correspond to close to 60 percent of GDP, this would imply a payroll tax of 13 percent if the scheme were to be financed from payroll taxes.

**Figure 1 Evolution of Old Age Dependency Ratio**



Pensioners relative to age group 20-64 years old.  
Source: Ministry of Economic and Business Affairs

### **ATP (Labor Market Supplementary Pension Scheme)**

Because the level of the social pension was rather modest, the authorities introduced in 1964 a supplementary pension scheme that initially only applied to employed persons but was later expanded to also cover persons on parental leave and recipients of sickness and unemployment benefits, etc. Coverage is optional for the self-employed and for recipients of disability pensions or early retirement benefits.

The ATP is funded by employer (2/3) and employee (1/3) contributions that are subject to relatively low ceilings (maximum of DKK 2,684 per year in 2004), corresponding to less than 0.9 percent of the average wage<sup>3</sup>. Contributions to ATP are not related to income, but are set as fixed amounts. These depend on a few broad categories that have been defined on the basis of the number of working hours. For people on transfer payment, contributions are split between the transfer recipient and tax payers (1/3 and 2/3 respectively).

Benefits are also subject to a low ceiling (the maximum annual pension for new pensioners with a full contribution record between 1964 and 2004 was DKK 22,428 in 2004). This was equivalent to 40 percent of the basic social pension and less than 8 percent of the average wage. Benefits used to be based only on the total size of

<sup>3</sup> The contribution amounts are adjusted from time to time. The maximum contribution was raised to DKK 2,924 in 2006.

contributions, irrespective of when they were made, but now investment returns are also taken into account.

**Table 2 ATP Coverage, Contributions and Benefits**

	1993	1995	2000	2004
ATP members (000s)	3,450	3,550	4,271	4,355
ATP pensioners	409	423	467	535
All pensioners	710	709	706	746
ATP/All pensioners (%)	58%	60%	66%	72%
Contributions (DKK billion)	4.05	4.64	6.30	6.68
Total contributions/GDP (%)		0.46%	0.49%	0.45%
Total contributions/Wage bill (%)		0.78%	0.86%	0.78%
Benefits (DKK billion)		2.60	3.23	4.84
ATP benefits/GDP (%)		0.26%	0.25%	0.33%

Source: ATP and Statistics Denmark

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. Bonus payments aim to maintain the real value of pensions. Lump sums are allowed when the amount of accumulated capital is small. Bonus payments reflecting the investment performance of ATP are made to both cash pensions and accumulated balances.

Coverage of ATP increased rapidly over the years (Table 2). The total number of member accounts exceeds the total labor force, a feature that is found in most other countries that do not suffer from evasion and under-reporting and reflects the temporary exit of economically active people from the labor force. The number of ATP pensioners has increased steadily relative to the number of recipients of the social pension. It reached 72 percent of all pensioners in 2004. It is projected to reach 98 percent when the extension of ATP membership to universal participation will reach maturity.

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.

## **B. Occupational Pensions**

Because both the social pension scheme and ATP pay modest benefits, most workers are also covered by private occupational pension schemes that have been promoted by collective bargaining. Participation is not mandated by law, but is effectively imposed by collective labor agreements. Three statutory supplementary pension schemes, in addition to ATP, have also been created on ad hoc basis. Two of these also have universal coverage, while participation in the third is voluntary and narrow.

## **Non-Statutory Occupational Pension Plans**

Occupational pension plans were first introduced in the 19<sup>th</sup> century. The first plan covered civil servants, but over time other privileged sectors, such as banking, insurance and utilities, also created pension plans for their employees. Coverage expanded gradually during the 20<sup>th</sup> century, but received a major boost in the late 1980s and early 1990s as a result of collective bargaining and political support through the offer of tax incentives. Political support was also offered through the establishment of the statutory supplementary pension schemes, such as ATP and a couple of additional savings-based statutory schemes (see below).

Denmark, like most OECD countries and unlike Australia and Switzerland, has not enacted a mandatory occupational pension pillar, but coverage is extensive and reaches almost 80 percent of the wage earners. Participation is compulsory without discrimination in those industries and companies where a pension plan has been created.

The vast majority of occupational pension plans are defined contribution plans, and they also offer death and disability benefits. Most schemes offer guaranteed investment returns and also involve the use of group annuities. Following legislation, unisex criteria are applied for the calculation of benefits under group annuities, even though women have a longer life expectancy than men. In addition, participation in standard occupational pension schemes, including life and disability insurance, and group annuities is not subject to health screening.

Because occupational pension plans have been established by collective bargaining rather than through a government mandated program, there is a wide variation of terms and conditions that reflect among other things industry or sector-specific factors. This variety adds to the complexity of the Danish pension system and makes its analysis very dependent on the availability of detailed data. However, the high fragmentation of the system among a large number of pension plans has impeded the compilation of detailed information on the design and structure of different pension plans as well as on their performance.

Three main types of institutions participate in the second pillar. Corporate pension funds, which cover the employees of single companies, play a marginal and declining part. Many of them are actually run-off schemes, having been closed to new members and even to new contributions. Thus, pension funds as known in several other OECD countries - i.e., closely linked to a sponsoring company - play a marginal role in the Danish market. Multi-employer pension funds are created as member-owned pension funds and cover industry-wide plans, such as for example nurses. Life insurance companies are the most important group of institutions. They are established as shareholder-owned joint-stock companies: some on a commercial basis (with shareholders demanding a return) and some on a non-commercial basis.

Life 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, life insurance companies and pension funds are subject to identical accounting, reporting and other regulatory rules and there is fierce competition between pension and insurance companies. Banking institutions play a small part in the second pillar.

Life insurance and multi-employer pension funds have the lion's share of the market for occupational pensions. Corporate pension funds have a small share of the market, while banks receive about 10 percent of total contributions.

Contributions to occupational pension plans increased steadily over the past ten years or so. Their annual growth rate was remarkably stable, ranging between 10 and 12 percent in nominal terms, while during the same period (1995-2004) inflation averaged 2 percent per year. The strong performance of contributions is reflected in their growing level relative to GDP, which nearly doubled from 2.36 percent in 1995 to 4.31 percent in 2004 (Table 3).

**Table 3 Contributions to Occupational Pension Plans, 1995-2004**

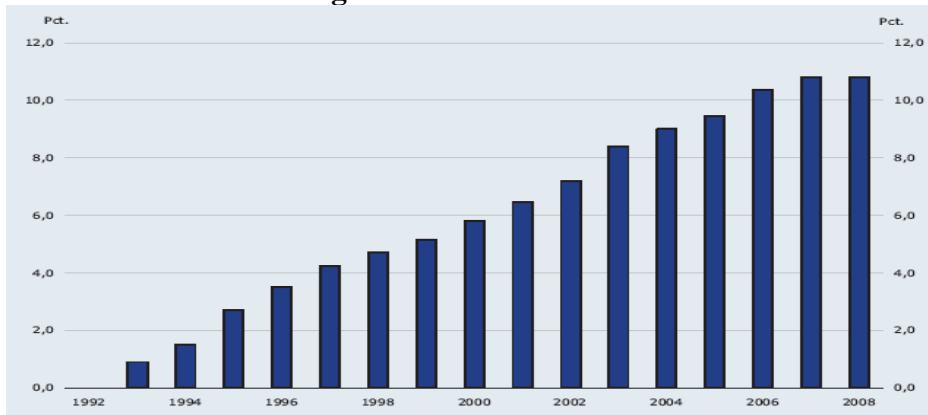
	1995	2000	2004
Contributions (DKK billion)	23.80	41.52	62.92
Contributions/GDP (%)	2.36%	3.21%	4.29%
Contributions to Annuities (% of total)	59.8%	57.2%	50.1%
Contributions to Phased Withdrawals (%)	9.9%	23.1%	35.1%
Contributions to Lump Sums (%)	30.3%	19.7%	14.7%
Contributions to L&P companies (%)	85.8%	89.6%	89.0%
Contributions to Banks (%)	14.2%	10.4%	11.0%
Contributions to Unit-Linked		5.2%	8.7%*

\* 2003

Source: Statistics Denmark, Central Customs and Tax Administration and the Danish Insurance Association.

The increase in contribution amounts is partly due to expanding coverage and partly to a gradually rising contribution rate. While contribution rates (like many other features of pension plans) vary considerably among different schemes, the upward trend in contribution rates is illustrated by the following figure, which represents the evolution of the average contribution rate for schemes covered by the labor agreement between the Danish Confederation of Trade Unions (LO) and the Danish Employers' Confederation (DA). This agreement covers half the labor force. The contribution rate has crept upwards from 1 percent in 1993 to over 10 percent in 2006 (Figure 2).

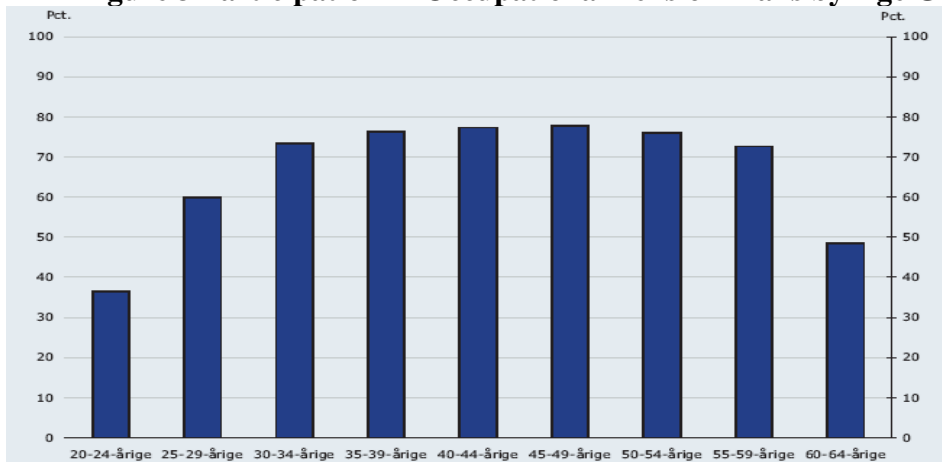
**Figure 2 Evolution of Contribution Rate**



Source: The Ministry of Economic and Business Affairs.

Expanding coverage is confirmed by the age pattern of contributors. The highest participation rate is shown by people aged between 35 and 50 at close to 80 percent, while those over 50 and especially those over 60 show much lower participation rates. This is not surprising, because many people above 60 take out tax subsidized early retirement. Younger people, especially those below 25, also report low participation rates - again, not surprising, because many have not yet entered the labor market (Figure 3).

**Figure 3 Participation in Occupational Pension Plans by Age Group, 2003**



Source: The Ministry of Economic and Business Affairs.

Occupational pension plans offer a variety of retirement products, ranging from life annuities to term annuities, phased withdrawals and lump sum payments. Most plans offer this choice of products. Plans differ in the degree of flexibility and choice they allow to their members. In some cases, the premiums for term life and disability insurance are allowed to vary with commensurate changes in the size of the related benefits, but otherwise all contributions are directed to group annuities. In other plans, members have broader choice between the different retirement products. Members are free to choose additional life or term annuities at any time, but once an annuity has been chosen the contract is not reversible.

In the case of occupational pension plans, 50 percent of contributions were allocated to annuities in 2004 (Table 3). 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 run for between 10 and 25 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 provisions, which sought to discourage the use of lump sums on retirement. It must be underlined that lump sum and phased withdrawal schemes can be converted into annuities at any time. Hence, data based on the allocation of contributions understate the actual share of annuities.

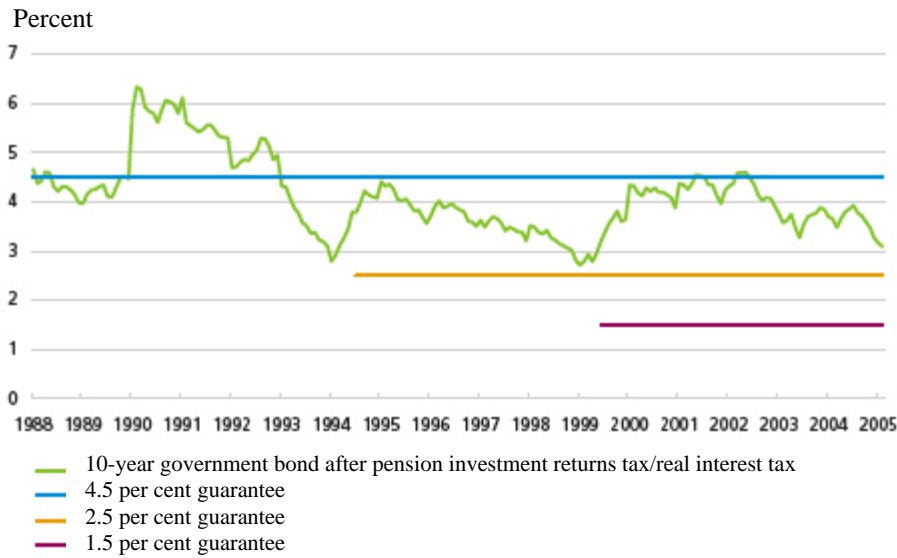
A relatively recent feature of the Danish pension industry is the offer of unit-linked products. This has been prompted by the reduction in guaranteed investment returns and a growing preference of plan members to invest in high return/high risk assets. However, the proportion of annual contributions that is allocated to unit-linked products is still small, at less than 9 percent of the total.

A distinguishing feature of Danish pension plans is the offer of minimum guaranteed 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 distribution of bonuses is based on the so-called contribution principle to avoid unjustified and distorting transfers across different groups of members.

The maximum guaranteed technical rate was initially set at 4.5 percent per year, 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 minimum guaranteed returns has reflected the evolution of market rates, especially the yields on ten-year government bonds (Figure 4).



**Figure 4 Guaranteed Interest Rates and After-Tax Yield-to-Maturity on a 10-year Government Bond, 1988-2005**



Source: Danmarks Nationalbank

### Statutory Supplementary Schemes

As already noted, three statutory supplementary schemes have been created over time to supplement the benefits obtained from the social pension and ATP. The most important is the SP (Special Pension Savings Scheme) that was introduced in 1998 to dampen economic activity and increase savings. However, contributions to the SP were suspended for 2004 and 2005. The suspension was later extended to 2007, creating considerable uncertainty about its future.

**Table 4 SP Coverage, Contributions and Benefits**

	1995	2000	2004
SP active members (000s)		3,128	3,391
SP pensioners			38
All pensioners	709	706	746
SP/All pensioners (%)			5%
Contributions (DKK billion)		6.88	0
Total contributions/GDP (%)		0.51%	
Total contributions/Wage bill (%)		0.94%	
Benefits (DKK billion)			.30
SP benefits/GDP (%)			0.02%

Source: ATP and Statistics Denmark

SP is administered by ATP. It is a defined contribution plan that is funded from a 1 percent contribution rate, paid by all wage earners, self-employed persons, and some recipients of transfer payments, aged between 16-64 years old. In 2004, coverage of the SP amounted to 3.4 million persons or 84% of the population aged between 16-64 years

old (Table 4). Benefits depend on the size of contributions and investment returns. Benefits take the form of ten-year annuities with payouts starting on retirement. But like ATP, smaller accumulated amounts are paid out as lump-sums. The total assets of SP corresponded to 2.5 percent of GDP in 2004.

The second supplementary scheme in terms of importance is the LD scheme that was introduced in 1977. This aimed at changing the then prevailing highly inflationary practice of automatically adjusting wages and salaries to “cost-of-living” increases. The LD scheme froze these “cost of living adjustments” into a special pension scheme. This involved the creation of individual accounts, investing the saved amounts, and paying out the accumulated capital of individual accounts as lump sums on retirement.

The LD scheme has not received any contributions or new members since 1980. About half its members have retired by now but there are still around 1.3 million workers with LD accounts. The scheme is managed by LD Pensions, a public sector institution that is similar to ATP. The total assets of LD amounted to DKK 58 billion in 2004, corresponding to four percent of GDP.

The third supplementary scheme is a narrow, voluntary scheme, known as SUPP. It was introduced in 2003 for people who had taken early retirement prior to that year and wanted to increase their future pension income by saving through tax-favored accounts<sup>4</sup>. This scheme covers about 250,000 people, representing 7 percent of the population aged between 18 and 65.

The pension provider can be freely chosen among ATP and private pension institutions (although not all of the latter participate in SUPP). One-third of the contributions are made by the pensioners themselves and two-thirds by the government. The benefits are similar to those of ATP - either a life annuity or a lump sum, depending on the size of the account balance. The rate of contribution is subject to a maximum of about 3% of the early retirement benefit.

### **C. Personal Pensions**

Personal pension plans constitute the third pillar of the Danish pension system. They are offered by banking, insurance and pension institutions 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.

Contributions to personal pension plans grew at a more modest rate over the past decade. In 1999, they suffered a large decline but otherwise they kept pace with the growth in national income. They amounted in 2004 to 1.36 percent of GDP (Table 5), at about one-third the level of contributions to occupational pension schemes. Total contributions to

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<sup>4</sup> Workers and employees receiving early retirement benefits after 2003 are mandated to contribute to ATP.

the second and third pillars were close to 6 percent of GDP or about 10 percent of earnings.

**Table 5 Contributions to Personal Pension Plans, 1995-2004**

	1995	2000	2004
Contributions (DKK billion)	15.584	16.209	19.933
Contributions/GDP (%)	1.54%	1.25%	1.36%
Contributions to Annuities (% of total)	11.8%	15.2%	15.1%
Contributions to Phased Withdrawals (%)	20.2%	37.6%	49.3%
Contributions to Lump Sums (%)	68.1%	47.3%	35.6%
Contributions to L&P companies (%)	40.8%	44.2%	41.7%
Contributions to Banks (%)	59.2%	55.8%	58.3%
Contributions to Unit-Linked		3.2%	6.5%*

\* 2003

Source: Statistics Denmark, Central Customs and Tax Administration and the Danish Insurance Association.

Contributions to annuities (life or term) have absorbed a small part of personal pension contributions at close to 15 percent. As in the case of second pillar contributions, there has been a major shift away from lump sum payments and in favor of phased withdrawals. This reflected changes in the tax treatment of lump sum payments. Banking institutions play a bigger part in personal pension plans than in second pillar plans, accounting for nearly 60 percent of total contributions. The relatively 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 some people for savings rather than insurance.

Members of personal pension plans are subject to health screening if they purchase any insurance products, while annuity prices are not based on unisex rates as is the case with occupational schemes. However, personal pension plans often benefit from guaranteed minimum investment returns that are similar to those offered in occupational schemes. The recent reduction in guaranteed returns has stimulated a growing interest in unit-linked products, and greater demand for individual choice. Contributions to unit-linked products reached 6.5 percent of the total in 2003. Unit-linked products benefit some times from a guarantee against negative returns by giving up some of the upside potential.

#### **D. Asset Accumulation and Investment Performance**

With expanding coverage, rising contribution rates (as suggested by the collective labor agreement between LO and DA) and positive real investment returns, the total assets of the pension system increased from DKK 847 billion in 1995 (corresponding to 83 percent of GDP) to 1,822 billion in 2004 (125% of GDP). This is comparable to the level found in Switzerland, the Netherlands and the UK and suggests the existence of a strong capital base for financing the pensions of retiring workers over the coming decades.

The relative shares of different pension institutions have been remarkably stable. LD, corporate pension funds and banks suffered some decline in their market shares, while ATP, life insurance companies and multi-employer pension funds experienced increases.

**Table 6 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

Pension institutions used to invest heavily in Danish bonds, especially Danish mortgage bonds that enjoyed a higher yield over government securities while being considered as highly safe. However, during the course of the 1990s, a shift toward Danish and foreign equities had taken place. As an example, in 1998, ATP invested 55 percent of its assets in Danish bonds, 26 percent in Danish equities and 10 percent in foreign equities (Table 7). Life insurance companies had more conservative portfolios because of the guaranteed elements of the products they offer, with Danish and foreign equities absorbing 25 percent of total assets in 1998. Pension funds had asset allocations that fell in between those of ATP and insurance companies.

However, the global decline in equity prices and a stronger emphasis on risk-based supervision induced a reconsideration of these investment policies. By 2004, ATP direct investments in equities, both domestic and foreign, fell to 18 percent of total assets and those of life insurance companies to 12 percent. For life insurance companies and pension funds, direct equity investments decreased to 15 percent of total assets. They increased their use of investment funds, which invest in diversified portfolios and may also incorporate various risk hedging elements. All types of institutions increased substantially their investments in foreign bonds, seeking higher yields and benefiting from the stability of the exchange rate between the Danish crown and the euro. They also increased their use of derivatives, especially long-term swap contracts in the euro market, to hedge their long-term liabilities.

The investment performance of different types of pension institutions was broadly similar. In a competitive market, where each company decides its own investment policy, some will perform above and some below market average, but for practical purposes the performance of the different groups of institutions should be considered as very similar.

**Table 7 Asset Composition**

	ATP		
	1995	1998	2004
Danish Bonds		55.0%	26.1%
Foreign Bonds		2.4%	32.2%
Danish Equities		25.2%	9.6%
Foreign Equities		10.7%	7.9%
Investment Funds		1.2%	3.1%
Real Estate		2.0%	1.8%
Derivatives			10.2%
Other		3.5%	9.1%
	Life Insurance Companies		
	1995	1998	2004
Danish Bonds	65.6%	55.2%	49.6%
Foreign Bonds	0.5%	1.6%	15.5%
Danish Equities	7.7%	12.2%	4.1%
Foreign Equities	4.7%	12.0%	7.7%
Investment Funds	0.4%	0.8%	6.4%
Real Estate	1.4%	1.2%	1.2%
Derivatives	..	..	..
Other	19.7%	17.0%	15.5%
	Multi-Employer Pension Funds		
	1995	1998	2004
Danish Bonds	59.2%	52.6%	27.9%
Foreign Bonds	0.6%	0.7%	12.3%
Danish Equities	14.3%	16.2%	5.8%
Foreign Equities	6.3%	13.0%	9.7%
Investment Funds	2.8%	4.4%	26.3%
Real Estate	6.3%	4.6%	5.4%
Derivatives	..	..	..
Other	11.5%	8.5%	12.6%

Note: Data on the use of derivatives is incomplete. Many life insurance companies and pension funds have hedged the interest rate risk on their liabilities through the use of derivatives.

Source: The Danish Financial Supervisory Authority and ATP

Average investment returns on total assets over the decade 1995-2004 amounted to 7.4 percent (Table 8). With inflation averaging 2 percent over the past decade, investment returns were substantially positive in real terms. All types of institutions achieved higher returns in the first half of the period. Returns in the second half were affected by the global collapse of equity prices and the large fall in interest rates.

Pension institutions in Denmark suffer when interest rates fall because the vast majority of mortgage bonds that represent a substantial part of their assets are callable and borrowers refinance their mortgages when rates are falling. Falling interest rates and the embedded call option of mortgage bonds also affect the financial solvency of pension institutions because the increase in the value of their long-term liabilities is not matched by a corresponding increase in the market value of their holdings of long-term bonds.

**Table 8 Investment Returns**

	<b>1995-99</b>	<b>2000-04</b>	<b>1995-2004</b>
ATP	9.9%	5.5%	7.7%
SP		2.9%	
LD	11.0%	6.0%	8.5%
Total Public	10.1%	5.4%	7.8%
Life Insurance Companies	10.4%	4.5%	7.4%
Multi-Employer Pension Funds	9.8%	4.1%	6.9%
Corporate Pension Funds	11.5%	2.8%	7.0%
Total Private	10.3%	4.3%	7.2%
Grand Total	10.2%	4.6%	7.4%

Source: The Danish Financial Supervisory Authority, LD Pensions and ATP

The operating expenses of pension institutions, at least for those institutions for which detailed data are available, are comparable to those of similar institutions in other continental European countries and significantly lower than those prevailing in Latin American private pillars. The operating costs of the pension accounts held with banks are not published but they are probably close to those of retail mutual funds and thus somewhat higher than those of life insurance companies and pension funds.

Benefiting from economies of scale because of its large size and also from its compulsory nature, ATP reports very low operating costs, again replicating the experience of similar institutions in other countries.

**Table 9 Administrative Expense Ratios (Percent of Average Assets)**

	<b>1995-99</b>	<b>2000-04</b>	<b>1995-2004</b>
ATP	0.045%	0.046%	0.046%
SP		0.268%	
LD	0.058%	0.067%	0.083%
Total Public	0.048%	0.069%	0.059%
Life Insurance Companies	0.576%	0.557%	0.567%
Multi-Employer Pension Funds	0.194%	0.157%	0.176%
Corporate Pension Funds	0.087%	0.085%	0.086%
Total Private	0.442%	0.425%	0.434%
Grand Total	0.348%	0.336%	0.342%

Source: The Danish Financial Supervisory Authority, LD Pensions and ATP

**Table 10 Investment Expense Ratios (Percent of Average Assets)**

	<b>1995-99</b>	<b>2000-04</b>	<b>1995-2004</b>
ATP	0.011%	0.023%	0.017%
SP		0.119%	
LD	0.073%	0.090%	0.081%
Total Public	0.023%	0.040%	0.032%
Life Insurance Companies	0.055%	0.098%	0.077%
Multi-Employer Pension Funds	0.153%	0.142%	0.148%
Corporate Pension Funds	0.145%	0.156%	0.150%
Total Private	0.087%	0.113%	0.100%
Grand Total	0.072%	0.095%	0.083%

Source: The Danish Financial Supervisory Authority, LD Pensions and ATP

**Table 11 Total Operating Expense Ratios (Percent of Average Assets)**

	<b>1995-99</b>	<b>2000-04</b>	<b>1995-2004</b>
ATP	0.056	0.069	0.062
SP		0.387	
LD	0.131	0.156	0.144
Total Public	0.072	0.109	0.090
Life Insurance Companies	0.631	0.656	0.643
Multi-Employer Pension Funds	0.347	0.300	0.323
Corporate Pension Funds	0.232	0.241	0.236
Total Private	0.529	0.538	0.534
Grand Total	0.420	0.431	0.425%

Source: The Danish Financial Supervisory Authority, LD Pensions and ATP

In general, public sector institutions have lower expense ratios than private sector ones (Tables 9 to 11). Administrative expense ratios are higher for life insurance companies and somewhat surprising for the SP fund. The main reasons for this are the nature of the public schemes as compulsory schemes and standardized products without possibility to adjust to individual demands.

Administrative expense ratios were stable or even declined over time. In contrast, investment expense ratios rose for all types of institutions, probably reflecting the greater intensity of investment policies and the more active search for improved returns.

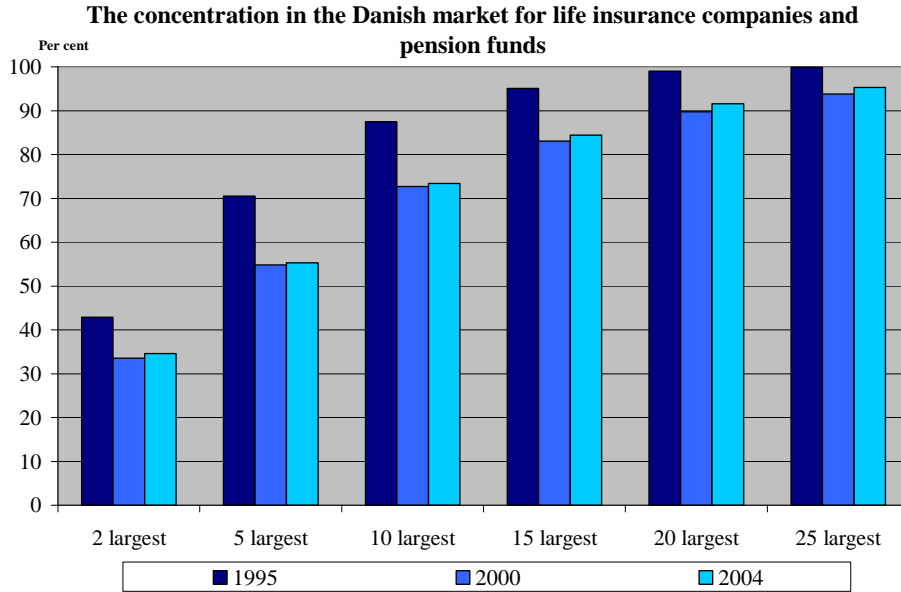
Despite the grave concerns that have been expressed in recent years about the solvency and investment performance of pension institutions, in the light of their long-standing guarantees, the overall performance of most types of pension institutions has been quite satisfactory. Investment returns have been substantially positive in real terms and have exceeded the guaranteed returns, while operating costs averaging 43 basis points for all pension institutions are low by international standards. However, the declining trend in returns and the negative results of 2001 and 2002 justify both the lowering of guarantees and the growing emphasis on risk-based regulation and supervision.

#### **E. Market Concentration**

Like the retail financial markets of most countries around the world, concentration in the market for pensions and annuities is on the high side. However, because of new entry in the market and the growth of some of those pension institutions that were established as part of labor market agreements, the share of the top five companies fell from 70 percent of total premiums in 1995 to 55 percent in 2004 (Figure 5). The Herfindahl Index of concentration also fell from 1267 to 854 over the same period. A Herfindahl Index of 854 is considered low and implies a contestable market. In fact, individual companies experienced significant changes in their market shares as well as rankings.



**Figure 5 Market Concentration**



Source: The Danish Financial Supervisory Authority

## F. Retirement Products

Retirement products include various types of annuities, phased withdrawals and lump sum payments. A distinguishing feature of the Danish pension system is the use of deferred group annuities, whereby workers commit to a life annuity at the time of making their contributions at a preset minimum conversion factor that reflects the guaranteed minimum interest rate and the life tables. Annuity payments are augmented by bonus payments if the actual investment performance exceeds the guaranteed return or if the mortality experience is higher than expected.

This type of policy avoids the problems of adverse selection and provides guaranteed minimum benefits, but also allows participation in any future superior performance. However, its success depends on the equitable distribution of bonuses and requires strong confidence in the integrity of the management of pension institutions.

The benefits paid by the system also include survivor benefits to the heirs of contributing workers in cases of early death as well as disability pensions in cases of incapacitation. These types of benefits are based on calculations of actuarial probabilities based on past experience as well as future projections and expectations. The system also provides annuities with a minimum number of guaranteed payments as well as immediate life annuities, which are purchased at the time of retirement (or even later).

Group contracts are generally specified in collective labor agreements. These aim to provide for minimum annuity benefits to complement the pension benefits from the public schemes and also include survivor and disability benefits. Participating employees and their dependents are not subject to individual health screening but costs and benefits

depend on group experience. Based on legislation, group annuities, like occupational pension schemes, are calculated on the basis of unisex rates. In contrast, individual contracts are not based on unisex rates and are subject to health screening.

Collective labor agreements vary in their specific terms and especially in the extent to which they allow for non-group benefits, such as phased withdrawals, lump sums, and unit-linked policies. Phased withdrawals are extensively used. For premiums to be deductible from taxable income, payments must be spread over at least 10 years but may run for up to 25 years. However, benefits cannot be paid after reaching the age of 85. Lump sum payments are also possible if provided under the pension contract or collective labor agreement that governs pension benefits. Their use has declined in recent years, but they are still the preferred form of benefit when accumulated balances are low.

Tax considerations also affect the choice of retirement product. In general, contributions are deductible from taxable income while benefits are subject to tax. The only exception is the special labor market tax of 8 percent which is levied on contributions but not on benefits<sup>5</sup>. Like some other countries with advanced occupational pension systems, such as Sweden, the Netherlands and South Africa, the investment income of pension institutions is subject to income tax at a flat rate of 15 percent. Other than the ceiling that is imposed on annual contributions to lump sum contracts, there are only few other ceilings on pension saving, but the application of a 15 percent tax on investment income acts as a disincentive to excessive saving through pension contracts for pure tax avoidance purposes.

Lump sum payments used to be favored by the tax system because they were subject to a flat rate of tax of 40 percent that was lower than the marginal income tax rates applied to annuity payments and phased withdrawals applying to high income earners.<sup>6</sup> Probably lump sums were also favored simply because many pensioners preferred to be able to decide upon the use of their savings early upon retirement. Reductions in the level of the value of the tax deductibility of premiums paid to lump sum schemes - for people paying the highest marginal rate of income taxation - have reduced the tax attractiveness of lump sum payments and this explains the declining share of new premiums that are allocated to lump sum contracts. However, generally speaking, the progressive nature of the Danish income tax system continues to confer benefits to tax deferral through pension saving.

Tax considerations explain the availability of data for the allocation of contributions to different contracts since tax deductibility depends on the identification of premiums by category of payout profile. However, no data is available on the distribution of payouts among the different types of benefits. This is probably due to the young age of the

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<sup>5</sup> The special labor market tax is not imposed on investment and transfer income. It is a regular tax that is not earmarked for any particular purpose.

<sup>6</sup> Before the tax rules were changed, contributions to lump sum schemes were deductible at the marginal rate of up to 58 percent, but lump sum benefits were taxed at a maximum rate of 40 percent. After the change in the rules in 1999, the maximum tax deduction of contributions to lump sum schemes was limited to 43 percent (i.e., it no longer applied to the top tax bracket of 15 percent).

universality of the pension system. Although occupational pension schemes have been in existence for a very long time, their expansion to near universal coverage is a relatively recent phenomenon. The new coverage has not reached maturity yet and there is little data on the conversion of phased withdrawals and lump sum payments into life annuities.

### **G. Risk-Sharing Characteristics**

One of the most interesting features of the Danish pension system is the extensive use of risk-sharing arrangements. These take several distinct but complementary forms. First, there is the social pension scheme, which provides minimum benefits with considerable additional payments for low-income pensioners. This is financed on a pay-as-you-go basis from general tax revenues. Second, extensive use is made of group contracts, including group annuities, under the quasi-mandatory occupational pension plans that are covered by collective labor agreements. Third, minimum guaranteed returns are offered for the accumulation and payout phases by both the second and third pillars. Fourth, the system is based on the management and distribution of bonuses on the basis of the so-called contribution principle that tries to avoid transfers across groups of customers. Both shareholder-owned joint-stock companies and member-owned mutual institutions compete for pension business and are subject to identical rules regarding the buildup of reserves and declaration of bonuses.

The size of the benefits allocated to members depends on the size of individual contributions, the investment income from accumulated assets, the operating costs of the plans, and the net results of insurance risks, arising from the offer of life, disability and longevity insurance. When employees join a plan, all future premiums, including those emanating from future pay rises as part of labor market agreements, are taken into account in calculating the level of guaranteed benefits. Even in the payout period, benefits which are not provided as lump sums are covered by the guarantee. The guaranteed benefits are computed by making projections that may extend for 60 years or longer, considering both the accumulation and payout phases. The risks to the pension institutions that provide the guarantees are potentially very large and necessitate the use of highly conservative assumptions.

The guaranteed benefits are calculated according to actuarial techniques, taking into account a number of assumptions concerning the future interest rate, the insurance risks, the expected costs, etc. The assumptions are made on a conservative basis. Under normal circumstances the realized results will show a surplus, most of which must be given during the life time of the pension contract to the insured in the form of regular bonuses.

The bonus policy is decided by the pension institutions. Life insurance and pension companies compete to offer the best bonuses to their customers. However, the freedom to establish the individual institution's own bonus policy is subject to severe restrictions. The so-called contribution principle sets clear limits on the use and release of realized surplus. The offer of minimum guaranteed benefits does not imply the transformation of the Danish pension system into a defined-benefit system. This is because the use of

highly conservative assumptions allows the declaration of large bonuses under normal circumstances.

Bonuses are often distributed to policyholders by increasing the guaranteed benefits. However, the guarantees on the bonuses themselves are given at the guaranteed rate prevailing at the time of bonus declaration and not at the rate that was guaranteed at the inception of the contract. Thus for most pension plans, the interest rate and insurance risks are shared between the pension institution concerned and the members. The risk that the realized investment return will be lower than the guaranteed rate is borne by the pension institution, while the risk of low investment returns but above the guaranteed floor is shared with the insured. In the same way, insurance risks, including longevity risk, are shared between the pension institution and the insured. The insured are guaranteed a minimum level of life long pension benefits, but a prolongation of the mean lifetime will result in lower pension benefits as long as they are above the guaranteed minimum level.

The guarantees are based on the total of the technical insurance elements: interest rate, insurance risks, and costs. Hence, a surplus in one of the technical elements reduces the risk of the company in the other elements. The technical rates, including assumptions on insurance risks, such as mortality and disability tables, must be notified to the supervisory authority before they can be used. The supervisor has the power to set aside the notified tables and demand a more cautious practice by a particular pension institution. But the supervisor does not provide any guidelines or benchmarks concerning mortality or disability tables. These matters are left to be decided by individual pension institutions on the basis of their particular experience but subject to notification to the supervisor. Traditionally the Danish pension institutions use population tables that do not incorporate projections of longevity improvements. They use different techniques to correct for such improvements, and many of them consider introducing cohort tables.

The continuing prevalence of pension contracts with the relatively high minimum guaranteed return of 4.5% has forced pension institutions to invest in a cautious way to lower their investment risks. However, this kind of investment policy is likely to result in lower returns over the longer run. This implies that choosing a guarantee for the pension benefits could produce lower pension benefits. Realization of this possibility has led to a growing demand for products without guarantees or with a lower level of guarantees. In the Danish market a large variety of such products has been developed during the last years - in both pillar II and pillar III schemes. Market supply is now much more diverse and allows customers to select the products that suit their personal characteristics.

In some pension schemes conditional guarantees have been introduced, i.e., guarantees under which it is possible in certain extraordinary circumstances to reduce the interest rate and thus reduce the guaranteed benefits. Such circumstances are defined in the contracts and depend on external events, such as changes in the market interest rate. The aim of such contracts is to provide the individual member of a pension scheme the maximum security of fixed minimum benefits under ordinary market conditions and at the same time allow the pension scheme to optimize its investment policy.

Other products have been introduced without any guarantee or with a low guarantee, normally a zero rate guarantee, which most often is a guarantee that workers will at least not lose the principal amount of their investments during the whole saving period, although they may still suffer losses from inflation. Another type of zero rate guarantees is a so called "water-level" guarantee, where interest once earned can never be lost again. These products typically offer customers a choice between a few investment categories with different risk profiles, while the actual investment management is left to the company. This gives customers a choice to adjust their investment risk to their age or other aspects of their economic situation.

The demand for unit-linked products has grown considerably in recent years, although it has not reached the levels found in other European countries. Unit-link products offer customers a choice of investment funds with varying policies as well as a choice of fund managers. However, most of the unit-linked products used in Denmark carry some sort of protection against investment risk, usually a zero-rate guarantee. In addition, most customers have opted for products where the investment policy is determined by the fund managers. Thus a fair interpretation of the Danish unit-link market would be that customers have not chosen unit-link products because of the investment choice but rather because of the higher degree of transparency that these products offer. This represents a partial move away from extensive risk sharing, a partial correction that may be fully justified in the light of the large fall in guaranteed returns.

## **H. Replacement Ratios**

Money's Worth Ratios are difficult to calculate in the Danish system because of the extensive reliance on bonus payments. An ex ante calculation would need to be based on assumed rates of future performance and bonus declaration, while an ex post calculation would require a considerable amount of data on actual bonus payments. However, while MWRs are not calculated, considerable effort is devoted in Denmark in calculating current and future replacement ratios.

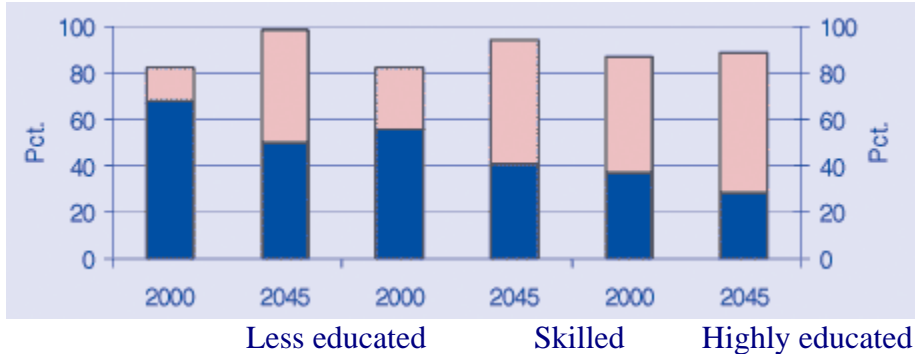
These are also based on assumptions about future performance and bonus payments but they take into account all types of pension benefits and even allow for tax payments. Two reports, one from the Ministry of Economic and Business Affairs<sup>7</sup> and the other from the Danish Pension Council<sup>8</sup>, provide details of current and expected replacement ratios. Although the two reports adopt slightly different methodologies, their basic results are broadly similar.

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<sup>7</sup> "Increased freedom of choice in pension saving", May 2003.

<sup>8</sup> "Pension contributions, replacement ratios and mortality", June 2005.

**Figure 6 Average expected replacement ratios for different groups of education in 2000 and 2045**



The blue part is public pension and the pink part is private pension.

Source: Ministry of Economic and Business Affairs (2003).

The average replacement ratio is expected to increase in the future irrespective of education (and income). For persons with a shorter education, the replacement ratio will increase from 80 percent in 2000 to almost 100 percent in 2045 (Figure 6). For highly educated persons it is projected to reach a little less than 90 percent in 2045. The reason for the shift in replacement ratios is the widening coverage of occupational pensions, which will affect in particular the lower income groups. For all groups, private pensions will play a more important role in the future, but the social pension will still represent the major source of income for pensioners with a modest income even in 2045.

**Table 12 Average Disposable Income of Pensioners, 2000 and 2045**

(1,000 DKK)	Singles		Couples	
	2000	2045	2000	2045
Social pension and housing subsidy	101	86	69	53
Private pension benefits	37	78	42	98
ATP and SP	6	23	6	26
Capital income	34	18	35	25
Tax	-45	-63	-43	-65
Disposable income	134	143	109	137

Note: 65-69-year-old in 2045 and 68-72-year-old in 2000. Only couples with both persons in the mentioned groups are included which simply give a sample of the pensioners in 2000. It shall be mentioned that the figures for ATP and SP for 2045 is already very uncertain to come true because contributions to the SP-scheme for the moment is suspended and SP might be totally abolished in a couple of years.

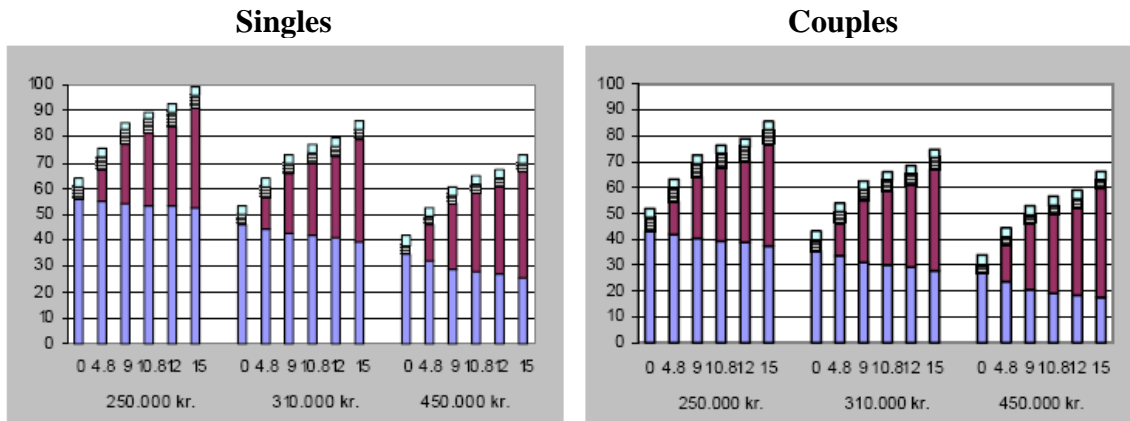
Source: The Ministry of Economic and Business Affairs (2003).

By looking at the income composition for average pensioners in 2000 and 2045, the same picture is evident as in Figure 6: the growing importance of private pension benefits at the expense of social pensions will be more evident in the future. Table 12 splits the pensioners in singles and couples which give a quite significant change in the income composition. Couples will on average experience a shift in the primary income source from public to private pensions in 2045 (even though ATP and SP are added to social pension and housing subsidy). In contrast, even though singles will be less dependent on social pensions in 2045 than in 2000, social pensions are still projected to be their primary income source at that time.

A more detailed approach is made by the Danish Pension Council. They show replacement ratios for different contribution rates and income groups for singles and couples (Figure 7), though only for 2003.

Figure 7 shows that people living as a couple each has a smaller replacement ratio than singles for the same income and contribution rate. This is mainly due to the fact that the income related supplement in the social pension is at a minimum for couples because of the design of the scheme.<sup>9</sup>

**Figure 7 Calculated Replacement Ratios**



Blue: Social pensions, Red: Occupational pensions, Residual: ATP and SP  
Source: The Danish Pension Council

For low income people, a high replacement ratio can be reached with even a relative low contribution rate, not least because the social pension and ATP play a relatively large role. To reach the same replacement ratio for high income people, it takes a much higher contribution rate (more than three times as much). This large difference can in part be attributed to the absence of personal (individual pillar III) pensions in the calculations, which underestimates the replacements ratios for high income groups. Personal pensions are more prevalent for high income groups, as shown in Table 13. Allowing for Pillar III pensions, the differences in replacement ratios among different income groups would be smaller than depicted by the Danish Pension Council.

<sup>9</sup> The social pension supplement is based on the household's total income.

**Table 13 Contributions to personal and occupational pension schemes in 2003 by Income Group**

Pension scheme Income (DKK)	Personal Pensions		Occupational Pensions	
	Fraction (per cent)	Amount (DKK)	Fraction (per cent)	Amount (DKK)
Up to 150,000	19	20,600	14	12,700
150,000-249,999	33	11,500	70	19,300
250,000-349,999	35	15,700	82	31,300
350,000-449,999	35	20,600	84	45,900
450,000-549,999	36	28,500	84	59,100
550,000-649,999	39	38,700	81	76,200
650,000 and above	44	52,300	80	147,700
Total	31	16,400	60	29,700

Note: The fraction shows how many persons in the age of 25-64 in a certain group of income who have contributed to a personal or an occupational pension scheme in 2003. The amount is the average amount for those who contributed to a pension scheme in 2003.

Source: Ministry of Economic and Business Affairs (2005).



### **III. REGULATION AND SUPERVISION**

#### **A. Overview**

Like providers of all financial services, pension institutions are subject to heavy regulation, the aim of which is to protect the interests of policyholders and members of pension plans - and to promote a competitive and efficient market for pension saving products, both during the accumulation and payout phases.

The regulatory environment deals with several main issues, such as:

- Consumer protection through detailed legislation as to how policyholders and members must be informed about the terms and conditions of their contracts before and after accepting them;
- Solvency rules and rules on assets eligible for covering technical provisions;
- Rules on stress testing;
- The release of market information aimed at the public, investors and policyholders, i.e. accounting rules and key performance indicators.

Denmark is a member of the European Union and its legislation is therefore based on EU directives - i.e. for solvency, accounting, and freedom of services across borders. However, as a general principle, EU directives are minimum directives. They provide broad guidance and leave ample room for detailed provisions to be determined by national authorities.

As already mentioned, there are only few legal differences between life insurance companies and other pension institutions in pillars II and III. They nearly all provide defined contribution schemes on a fully funded basis. Hence, they fall under the scope of the EU Life Insurance Directives. Corporate pension funds in the sense known from other European countries (i.e., closely integrated into a particular company) do exist, but they play a very marginal role.

In the local Danish regulation, all pension institutions, where they are established as life insurance companies or pension funds, are subject to the Financial Services Act (the main law governing all financial services) and to all secondary legislation established as a consequence of this act. Therefore, they are all subject to the same legislation on the contribution principle, to the same investment and solvency rules, to the same accounting framework, stress testing requirements and so on. Any differences primarily mirror institutional differences - i.e., pension funds have no external shareholders and do not pay dividends and hence they are not subject to company taxation rules in contrast to commercial life insurance companies.

For a number of reasons the Danish rules on these issues deserve attention. First of all, in pension systems relying more or less on private pension provision, there must be an economic framework governing accounting and solvency. Secondly, the underlying economic regulatory environment of the Danish life insurance and pension business is to

a large extent based on providing information to the markets, thereby, contributing to market efficiency. In this respect the Danish rules and in particular the full fair value model of the accounting rules and the stress testing regime represent an early and pragmatic implementation of principles and ideas which are still debated in many other countries. Thirdly, in the EU area both the solvency and the accounting rules are presently going through a thorough examination in order to become more market-based and risk sensitive. The Danish experiences give valuable input to this process.

This chapter deals with the basic regulation of life insurance companies and pension funds which guides their economic decision-making. In other words, legislation relating to consumer information and more general legal issues will not be dealt with. Issues to be discussed include:

- Investment rules
- Valuation Rules
- Capital rules
- Technical Provisions
- Solvency Margin
- The Traffic Light System

## **B. Solvency Rules, Investment Rules and Stress Testing**

Like the accounting rules and the general approach to regulation of insurance activity in Denmark, the solvency rules for Danish life insurance companies and pension funds are identical. The rules are based on the European Union directives. Since the European directives represent minimum requirements, the different member states have the option to impose other (tighter) rules on the companies under their jurisdiction.

The solvency requirements for life insurance, in Denmark and in the EU, represent 4 percent of the technical provisions plus a requirement on the sums insured - adding to approximately five percent of technical provisions. Under the fair value accounting rules, the technical provisions represent the sum of the guaranteed benefits, the bonus potential on future premiums and the bonus potential on premiums paid (as further detailed below).

However, the current solvency rules - based on European directives - are not risk based. The required solvency margin is only reduced to 1 percent when the institution does not bear the investment risk, as for example in unit-linked products that are offered without any guarantees. If the product in question contains *any* guarantee on the return, meaning that the insurer bears some of the investment risk, the solvency requirement is as described above. Thus, a contract with a guaranteed return of 0 percent implies the same solvency requirement as a contract with a guaranteed return of 4.5 percent - notwithstanding that the latter contract clearly exposes the insurer to a larger risk.

The solvency requirement has to be met with *available capital* at least equal to this requirement. Available capital is defined to include shareholders funds - assets less liabilities - with some additions and reductions. Subordinated loans and Special Bonus

Provisions (type B) count as available capital when certain conditions are met. Special Bonus Provisions belong to policyholders, but are counted as part of the capital covering the solvency requirement. They bear the same risk and remuneration as equity capital. Special Bonus Provisions (type A) resemble subordinated loans. However, they have so far not been used by any life insurance company or pension fund.

On the asset side, quantitative limits apply. Especially, there are restrictions on the share of assets which can be made up of so-called "risky assets", notably equities. Moreover, quantitative limits are applied in order to reduce concentration risks. For example, quantitative limits apply to the possible exposure to *one* issuer of mortgage bonds or the proportion of total assets which might be invested in the securities of just *one* company or a group of closely related companies.

While quantitative limits still apply, there has over a number of years been a gradual move toward regulation based more on the Prudent Person Principle (PPP). The PPP implies that greater emphasis is placed on the pension institution behaving prudently, controlling and monitoring risk, rather than on specific quantitative limits.

Especially, over a longer time span, the share of assets which can be invested in "risky assets", like equities, has been increased. In 2001 the proportion of assets covering technical provisions, which could be invested in risky assets, was raised from 50 to 70 percent. The reason for the increase was that some institutions had reached the former ceiling of 50 percent and still wanted more freedom to invest.

The increase, however, was not granted without conditions. It was accompanied by a political wish that the actual share of risky assets in the portfolio should be considered against so-called "objective criteria - in the sense that the share of risky assets should be based upon an assessment of the company's actual capital strength measured against its risks on investments and commitments".

These objective criteria were implemented in terms of the so-called system of traffic lights known from the banking sector (a political aim was to ensure that identical investment risks in different financial sub-sectors would imply the same solvency requirement). Since the introduction of the traffic light stress testing, the share of risky assets (equities) has steadily fallen, mainly because of adverse market developments.

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

### **C. Register of Assets Covering Technical Provisions**

All life insurance companies and pension funds have to keep a register of the assets covering technical provisions. At any time there must be assurance that the company in question holds enough assets to cover its technical provisions. A certain procedure and

guidance exists as to how the register must be kept, monitored and approved by the company's auditor. Moreover, the supervisor will occasionally check that all regulations pertaining to the register are met.

The register is the Danish way of implementing the so-called winding-up directive from the European Commission. It serves to ensure that there are assets to cover technical provisions in case of a winding up procedure, if a company faces severe solvency problems. The registered assets in this case serve to fulfill obligations toward the policyholders, i.e., before liabilities toward any creditors are met.

#### **D. Valuation Rules - Assets**

The Danish accounting rules for life insurance and pension institutions are often termed market-value accounting rules. On the asset side the fair value model reflects the fact that all assets must be measured at their market value by using observable market prices or by using a valuation technique in the case of non-active markets. For the majority of assets - like shares and bonds - there is an active market where the assets are traded, giving rise to observable market prices. For property an economic model is used to provide an estimate of the market price. For the remaining assets - like unlisted shares - a best estimate for the market price must be applied.

One can always discuss whether the price information from financial markets truly reflect market values and how ownership issues - like pricing dominating ownership - should be dealt with in a market-value environment. This gives rise to the ongoing controversy about the distinction between market and fair values; however, this is a separate issue beyond the scope of this paper. In the following the terms, market value and fair value, are used interchangeably.

The road towards market valuation on assets was completed in 2002. In 1995 life insurance companies had been given the option to measure property at market value, and in 1998 it was made mandatory to value shares and property at fair values. Bonds which made up a large part of assets in most pension institutions had to be measured at "mathematical values", where the market price was increased until maturity assuming a constant interest rate as of the day of purchase. In 2002 it became mandatory to also measure bonds at their current market price.

Hence, since 2002 all assets in life insurance companies and pension funds have been measured at fair value with value changes - realized and unrealized - shown in the profit and loss account.

#### **E. The Prevalence of With-Profits Contracts**

Before discussing the evolving rules on the valuation of liabilities, two important features of the Danish scene need to be noted. These are the prevalence of with-profits contracts and the use of the so-called contribution principle.

Until recently almost all pension contracts in the Danish market were contracts with participation features, meaning that policyholders were entitled to guaranteed benefits and to a share (bonus) of any surplus realized by the pension institution. This was the case for both pillar II (occupational) and pillar III (personal) pension schemes.

Over the past few years market trends have changed. New contracts are increasingly written without the with-profits feature and minimum guaranteed benefits. However, for many years to come the majority of the portfolio of contracts will be with-profits based.

An important feature of the traditional life insurance and pension products in the Danish market is the smoothing of returns allocated to policyholders over time. Policyholders do not receive the return obtained by the pension institution in a given year. Instead, pension institutions aim to increase benefit entitlements steadily over the years. Hence, in years when financial markets provide high returns, reserves are boosted to provide cover for years of financial distress. And in years when financial markets provide only low or even negative returns (i.e., returns may be lower than corresponding to the guaranteed return), individual policyholder benefits are maintained by drawing from the reserves.

This smoothing of returns attributed to individual policyholders is called an "average interest rate environment", signaling that returns are evened out across policyholders and over time. The system has served to provide policyholders with confidence and clarity as to their financial situation upon retirement or in case an insured event occurs.

The system has, however, come under strain in recent years, not least due to the financial market turmoil in the early years after 2000. Moreover, the smoothing of returns and the use of guaranteed benefits have met criticism from academics and politicians. The latter have claimed that the provision of guaranteed returns to policyholders conflicts with an optimal asset allocation, because pension institutions are given incentives to achieve stable market returns instead of balancing expected return against risk over a longer time horizon. Following this argument, the composition of a pension portfolio will be skewed towards bonds and other "safe assets" and away from "risky assets", like shares.

Another claim has been that the average interest rate environment leads to an unacceptable redistribution of returns among policyholders. Depending on the relative level of investment returns and guaranteed rates, the redistribution may flow from older to younger policyholders or vice versa. For example, it has been claimed that older policyholders (who signed contracts in years when interest rates and financial market returns were relatively high) have in effect been paying for part of the returns provided to younger policyholders (who joined the system when obtainable market returns were lower) - because at a given point in time both groups receive the same return. However, as discussed below, when investment returns are below guaranteed rates, redistribution may flow in the opposite direction.

## **F. Use of the Contribution Principle**

It is important to note, however, that within the average interest rate environment pension institutions are not free to redistribute market returns as they wish - neither among policyholders nor between policyholders on the one hand and owners on the other hand. The redistribution possibilities are closely regulated by the so-called contribution principle.

An important risk facing the traditional guaranteed products is the risk of systematic biases in the distribution of bonuses across different generations of insured. Under normal conditions, the use of minimum guarantees smoothes out the fluctuations of the market rate into a more stable interest rate, so that increases in the guaranteed benefits do not fluctuate from year to year as much as market rates do. This stability in the development of the benefits is seen as one of the major attributes of minimum guarantees.

However, in periods of declining interest rates, this technique implies the risk of systematic transfers from younger to older generations. This is because older generations may benefit from guarantees based on a higher interest rate than younger members. The contribution principle regulates the distribution of bonus results between shareholders and policyholders and among different generations of policyholders.

The contribution principle states that policyholders are entitled to a fair share of the surplus (bonus) established as a result of the use of prudent assumptions. Policyholders are entitled to bonuses in relation to how the premiums have contributed to income in the company.

The contribution principle consists of two elements. The first element relates to the distribution between the owners of the company and the policyholders as a group ("the principle of calculation according to contribution"). The owners have contributed with own funds, which may be shareholder capital or so-called Special Bonus Provisions (policyholder 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.

Policyholders are on the other hand entitled to a share of the income generated that corresponds to the premiums they have paid in and the accumulated interest and bonuses added to the premiums in the course of the contracts.<sup>10</sup> Income is not divided mathematically in the same relation as the relation 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.

It is required that the companies notify to the supervisory authority their policy for allocation between owners and policyholders. Pension institutions have some discretion

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<sup>10</sup> The company in question may allocate specific assets to the shareholder capital and receive the yields on those assets.

regarding their allocation policy but subject to a legal requirement to respect the overall objective of fairness in relation to policyholders.

The principle of calculation according to contribution states that the “realized result” must be divided between owners and policyholders so that the part accruing to the portfolio of insurance contracts is reasonable in relation to the manner in which the portfolio contributed to this result. The realized result is defined as the difference between the actual result of income and expenses, gains and losses in a given time period and the same result as it would have been if things had developed in accordance with the prudent assumptions inherent in the contracts.

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.

According to the principle of calculation according to contribution, the life insurance company shall divide the own funds' part of the realized results into one part related to the return on own funds, and one part reflecting the extent of the risk incumbent on own funds (a risk margin to the own funds). In the notification to the supervisor, an explanation shall be given of how the part stated in the notification is reasonable compared to the risk incumbent on own funds.

This risk margin can not always be distributed to the own funds. A larger part to owners than to policyholders may only be distributed to own funds, when this larger part plus the amounts distributed to the insurance portfolio can be covered by positive realized results for the year. If the realized result for the year is not sufficient to allow distribution to own funds of the part of the realized results warranted by the principles of calculation, the company may rectify the situation in future years if the realized results permit this.

The other element of the contribution principle is the allocation among policyholders ("the principle of distribution according to contribution"). Policyholders have different contracts with different terms. The amounts allocated to the individual policyholder do not necessarily correspond exactly to the amounts relating to the individual contract. The size of the allocated amounts could reflect different risks associated with a specific type of contract. In relation to the principle of distribution according to contribution, 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 towards the principle that bonuses should be released to individual policyholders in the course of the contract in a way that ensures a fair distribution between policyholders with different characteristics.

## **G. Valuation Rules - Liabilities**

There is no active market for insurance liabilities and therefore no readily observable market price. For years this has been a major argument against the introduction of market valuation principles in life insurance in many countries. There is no internationally accepted fair value model for life insurance liabilities. And the problem is real: how can market rates for liabilities be established without the existence of either a market or a close substitute of a market? The Danish government took up this challenge in 1998.

In 1998 the government set up a special Market Value Committee comprised of representatives from the supervisory authority, which held the chairmanship, the life insurance and pension industry, the actuarial profession and the accounting profession. The task of this committee was to create a suitable model for the measurement of life insurance and pension liabilities when all assets are measured at fair value. The committee was given four years to complete this assignment.

In the end the Committee solved its task and reached consensus on a suitable model for the valuation of life insurance and pension liabilities, though after lengthy discussion and debate. The completion of the work of the Committee and the introduction of "The Danish Model" does not imply that a general solution has been found to the complex and internationally unsolved issues of how to fair value life insurance and pension liabilities without a well-functioning market for those liabilities. Instead, the Danish model represents a pragmatic response to the question of how to find a workable measurement method for these liabilities when assets are measured at fair value.

### **Decomposition of Technical Provisions**

The work undertaken in the Danish Market Value Committee led to a decomposition of the traditional liabilities (technical provisions) into several components:

- The *guaranteed benefits* measure the difference between the market value of the benefits guaranteed according to the terms of the insurance and pension contract and the market value of the future premiums to be paid.
- The *bonus potential on future premiums* measures the market 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 provision and the guaranteed benefits on paid up premiums. If this difference turns out to be negative, it is set at zero.



Furthermore, the *collective bonus* measures the value of bonuses which have been allocated to policyholders as a group on the basis of the principle of calculation according to contribution, but which have not yet been allocated to individual policyholders.

The sum of guaranteed benefits, bonus potential on future premiums and bonus potential on premiums constitute the technical provisions, which form the base for calculating the solvency requirement. Collective bonus is not a part of the technical provisions and is, therefore, not taken into account for the computation of the solvency margin.

### **Assumptions Governing Technical Provisions**

When measuring the components of technical provisions into the three elements mentioned - guaranteed benefits, bonus potential on future premiums and bonus potential on premiums paid - the accounting rules state that assumptions must be based on:

- The best estimate of relevant underwriting risks, i.e. mortality, morbidity etc.;
- The best estimate of market costs (administration costs) for which the insurance policies, on average, could be administered on conditions governing the market;
- A discount rate as prescribed by the supervisor (see separate section below).

Hence, technical liabilities must be reported at their best estimate. There are no general assumptions which are to be used. The life insurance companies and pension funds must base measurement of their liabilities on their best estimates and take into account any future projected developments. In addition to the best estimates, a risk margin must be added. This risk margin is described in some detail below.

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

If assumptions - like mortality assumptions - turn out to be unfavorable for the pension institution, because improvements in life expectancy have not been properly taken into account, then this risk must be borne by the institution and the policyholders in accordance with the terms of the underlying contracts. Although the supervisor is keeping a close eye on the key assumptions behind the best estimate calculations, ultimate responsibility does not rest with the supervisor nor the government, but with the pension institution.

Under current circumstances, life expectancy is actually seen to be improving in Denmark. If the pension institutions do not take this development properly into account, they must still live up to the promises they have given (in the contracts). This might lead to losses on mortality assumptions.

If this should be the case, any losses must be accounted for according to the contribution principle, and hence, the losses may be shared with policyholders. Moreover, any

surpluses on other assumptions - like costs - may alleviate the problem, still in accordance with the contribution principle.

Concerning the guaranteed benefits, these are increased in accordance with the contracts (i.e., as mentioned in chapter I on entering the contract it is often stipulated that future premiums are also guaranteed in the sense that they give rise to guaranteed benefits). But there is no formal price or wage indexation. However, future wage increases give rise to increased premiums which often give rise to increases in guaranteed benefits - still, though, depending on the terms of the contract in question.

Collective bonus acts as a buffer - both in relation to fulfilling the guarantees given and to absorbing losses according to the contribution principle. Collective bonus is not a residual, as the individual institution must assess the need for collective bonus in conjunction with a requirement to release surplus to the individual policyholders at reasonable terms over the contract period. The need for collective bonus, naturally, is quite dependent on the guarantees given: the higher the level of guarantees, the higher the need for collective bonus.

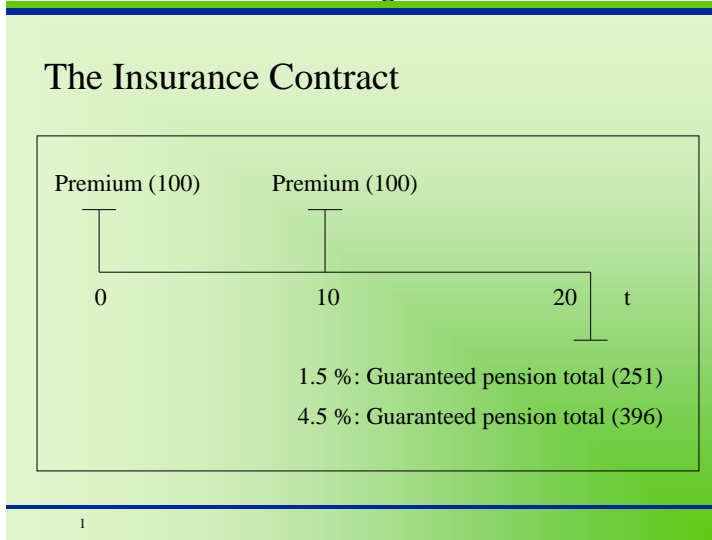
It is important to note that, again in accordance with the contribution principle, the bonus potential on future premiums may be used to absorb losses. This is illustrated in the example below.

#### **H. Market-Value Accounting Rules - Some Examples**

In the following examples only financial risks are considered. This is for simplicity only, and because the focus of attention in the Danish case has been on financial risks. The example could have been worked through with any of the risks involved in the life insurance and pension contract, i.e. also underwriting risks and cost risks.

Assume a life insurance contract with 2 premium payments as shown in Figure 8. At time 0 a premium of 100 is paid, and at time 10 (in ten years), another 100 is paid in premium. The contract terminates after 20 years when the benefit is paid to the policyholder as a lump sum.

**Figure 8 The Insurance Contract**



If the guaranteed benefits in 20 years are calculated with a technical interest rate of 1.5 percent, the value at termination will be 251. Using a technical interest rate of 4.5 percent, the value at termination will be 396.

Clearly, the contract carrying guaranteed benefits calculated with a technical interest rate of 4.5 percent is more risky to the insurer than the contract carrying the lower technical interest rate. However, before the introduction of the fair value accounting rules, the difference in risk profile would not show up in the accounts. In the example shown below, the market rate of interest is assumed to be 4.5 percent.

**Figure 9 Balance Sheet Under the Old and the New Accounting System**

**Balance Sheet under the old and the new Accounting System**

Old Method (1.5% and 4.5%)	New Method	
	1.5%	4.5%
Equity (10)	Equity (10)	Equity (10)
	Collective Bonus(15)	Collective Bonus(15)
Bonus Equalisation (15)	Bonus on Premiums paid (44)	Bonus on Premiums paid (0)
	Bonus on future Premiums (16)	Bonus on future Premiums (0)
Technical Provisions (100)	Guaranteed Benefits (40)	Guaranteed Benefits (100)

2

Under the old accounting rules, the balance sheet for the two contracts would be identical. Under the fair value accounting rules, the composition - though not the level - of technical provisions differs between the two contracts (Figure 9).

For the contract carrying a technical interest rate lower than the market interest rate (1.5 percent), the guaranteed benefits can be calculated at 40. This figure corresponds to the 251 measured at present value, discounted for 20 years with the market interest rate of 4.5 percent and reduced with the present value of the future premium. On the paid up premium (100) the insurer must give the insured a return of 1.5 percent. As the market interest rate is 4.5 percent and therefore, exceeds the guaranteed rate by 3.5 percent, it gives rise to a bonus potential on premiums paid of 44, which is the difference between the paid up premium (100) and the market value of the guaranteed benefits on the paid up premium (56). Likewise, if the market interest rate stays at 4.5 percent, there will be a bonus potential on the future premium (16), which is the difference between the guaranteed benefits on the paid up premium (56) and the guaranteed benefits of 40. The three elements of life insurance provisions, i.e., guaranteed benefits, bonus potential on the future premium and bonus potential on premiums paid all add up to 100, which is the paid up premium. The bonus potential is positive because the market interest rate is assumed to be above the guaranteed rate giving rise to buffer elements.

For the contract where the guaranteed benefits are calculated at the same rate as the market interest rate, there is no bonus potential. Hence the value of the guaranteed benefits will be equal to the paid-up premium of 100, corresponding to the present value of 396.

**Effects of Changes in the Market Interest Rate**

In the following we will show how market-induced changes in the interest rate affect the fair value accounting of the two contracts. For simplicity it is assumed that there is only one premium payment (at inception), with the result that we can leave out the bonus potential on future premiums. The contracts run for 20 years. The starting point for the example is shown below (Figure 10).

**Figure 10 Starting Point**

Liabilities		Assets
1.5%	4.5%	
Equity (10)	Equity (10)	Stocks (50)
Collective Bonus (15)	Collective Bonus (15)	
Bonus on Premiums paid (44)	Bonus on Premiums paid (0)	Bonds (75)
Guaranteed Benefits (56)	Guaranteed Benefits(100)	
		Total Assets: 125

Assume that the market interest rate drops from 4.5 to 3.5 percent and that a 1 percentage point change in the interest rate gives rise to an opposite change in the value of bonds of 10 percent (Figure 11). On the asset side, this gives rise to an (unrealized) gain of 8. On the liability side the value of the guaranteed benefits increase, because the future benefits are discounted at a lower market interest rate. Correspondingly, the room for future bonus has decreased.

**Figure 11 Interest Rate Decrease**

Liabilities		Assets
1.5%	4.5%	
Equity (11)	Equity (10)	Stocks (50)
Collective Bonus (22)	Collective Bonus (2)	
Bonus on Premiums paid (32)	Bonus on Premiums paid (0)	Bonds (83)
Guaranteed Benefits (68)	Guaranteed Benefits(121)	
		Total Assets: 133

For the low risk contract, the new market interest rate is still above the rate used for calculating the guaranteed benefits indicating that there is still a buffer in terms of bonus potential on premiums paid. Thus, the value of guaranteed benefits increases, but does not exceed the paid up premium of 100 leaving room for a bonus potential, which is, however, decreased to 32. The gain in the value of the bond portfolio (8) is split between the insured and the shareholders in line with the principle of calculation according to contribution, leaving 1 for equity and 7 for the insured (hence increasing the collective bonus).

For the high risk contract, the new market interest rate is now below the rate used for calculating future benefits. The potential for bonus is negative; however, the bonus on premiums paid has a floor of 0. The value of guaranteed benefits rises to 121, i.e. the total value of technical provisions increases above 100. The increase of 21 less the asset gain of 8 (13) represents a loss, a negative realized result, and therefore a positive amount cannot be allocated to equity. The loss must be divided between shareholders and the insured in line with the principle of calculation according to contribution. However (more than) the total negative result is attributed to the insured, and the value of collective bonus is written down with the full amount of the loss.

Clearly the fair value accounting system reveals the difference in the risk profile between the two contracts.

Assume instead that the market interest rate increases to 5.5 percent. The resulting balance sheet is shown below (Figure 12).

**Figure 12 Interest Rate Increase**

Liabilities		Assets
1.5%	4.5%	
Equity (9)	Equity (9)	Stocks (50)
Collective Bonus (8)	Collective Bonus (8)	
Bonus on Premiums paid (54)	Bonus on Premiums paid (17)	Bonds (67)
Guaranteed Benefits (46)	Guaranteed Benefits(83)	
		Total Assets: 117

The increase in the market interest rate represents a loss in the value of the bond portfolio on the asset side. On the liability side, the value of guaranteed benefits decreases for both contracts, while the bonus potential increases, reflecting a bigger potential for future bonus for both contracts. For both contracts the sum of guaranteed benefits and bonus potential is 100.

The loss in the value of the bond portfolio must be divided between equity and the insured on the basis of the principle of calculation according to contribution. Equity is reduced by 1 and collective bonus by 7.

**Effects of Changes in Equity Prices**

Let us turn to the balance sheet effects of a drop in the market value of shares. If shares drop by 20 percent to 40 there is no effect on the technical provisions. The loss of 10 must be divided between equity and the insured. Equity is reduced with 1 and collective bonus with 9 (Figure 13).

**Figure 13 Balance Sheet After Stocks Fall by 20 percent**

Liabilities		Assets
1.5%	4.5%	
Equity (9)	Equity (9)	Stocks (40)
Collective Bonus (6)	Collective Bonus (6)	
Bonus on Premiums paid (44)	Bonus on Premiums paid (0)	Bonds (75)
Guaranteed Benefits (56)	Guaranteed Benefits(100)	
		Total Assets: 115

In this case, the collective bonus is of a size enabling the cover of the fall in the value of shares. But assume share prices were to fall by 40 percent instead of 20 percent (Figure 14).

**Figure 14 Balance Sheet After Stocks Fall by 40 percent**

Liabilities		Assets
1.5%	4.5%	
Equity (8)	Equity (5)	Stocks (30)
Collective Bonus (0)	Collective Bonus (0)	
Bonus on Premiums paid (41)	Bonus on Premiums paid (0)	Bonds (75)
Guaranteed Benefits (56)	Guaranteed Benefits(100)	
		Total Assets: 105

In this case the shares would be reduced in value by 20. The insured would have to cover 18 and equity 2. But collective bonus can only cover 15.

For the high risk contract this leaves the ultimate responsibility for covering the loss with the equity which is reduced from 10 to 5. Equity has covered 3 on behalf of policyholders. These 3 might be recaptured in future years in line with the contribution principle. But there is no assurance that the economic conditions and terms of the contract will actually render this possible.

For the low risk contract the bonus potential also vanishes. However, and very important, the principle of distribution according to contribution states that once the collective bonus has been used to absorb losses, the bonus on paid up premiums can be used to cover losses. Hence, the bonus on paid up premiums is reduced with 3, and the equity only covers its share of the loss, i.e. 2.

Again, the inherent difference in risk profiles between the two contracts shows up in the fair value balance sheet.

The fair value accounting rules enable management to better monitor the risks of the insurance portfolio and provide better and more relevant information for users, the media and the public. The benefits of this accounting system, however, go further than merely providing better accounting information. The fair value accounting rules also have real economic effects. In this regard, the possibility to use the bonus potential on paid up premiums to absorb losses also implies that the asset allocation can be better optimized for contracts carrying relatively low risk.

## **I. Guidance on Market Discipline**

As described in other parts of this paper, the Danish life and pension market is characterized by a relatively large number of life insurance companies and pension funds. Some are commercial companies trying to make a return to external shareholders; others are pension funds with no external shareholders; and others are formally set up as life insurance companies, but their shareholders contribute only a small amount of capital and do not expect a return on this capital.

Despite these different organizational set ups, the companies are regulated under the same legal framework and competition is quite fierce. All institutions have to fulfill the same solvency requirements, and any institution experiencing growth must meet increasing solvency requirements - with capital provided from external shareholders, as subordinated loans, from policyholders, or in the form of retained surplus.

One important issue in recent years has been the way in which the different life insurance companies and pension funds divide the result obtained in a given year between policyholders and equity. It has become a focus of attention in the media and an important parameter affecting the competitive environment among the companies. In order to improve market transparency and comparability the supervisor has issued a "Guidance on market discipline and notification of rules relating to the equity's share of the realized result in life insurance companies and pension funds". The focus point is the risk premium awarded to shareholders.

The realized result must - in line with the principle of calculation according to contribution - be divided between the equity and the policyholders in order that the part accruing to the portfolio of insurance contracts is reasonable in relation to the manner in which the portfolio contributed to this result. The life insurance company shall submit to the supervisor the rules and assumptions applied for the calculation of the part of the



realized result that accrues to its equity. Returns on special bonus provisions (type B) shall be treated in the same way as equity.

In the notification the company shall divide the equity's part of the realized result into one part related to the return on equity, and one part reflecting the extent of the risk incumbent on equity. In the notification an explanation shall be given of how the part stated in the notification is reasonable compared to the risk incumbent on equity.

The aim of this regulation is not to establish rules (i.e. maximums) on the risk premium which can be allocated to shareholders. Instead, the supervisor intends to force the management to consider the risks facing the equity in order that the remuneration to both insured and equity becomes fair and based on clearly specified conditions. Moreover, it becomes possible to compare the risk premium to equity before and after the accounting year, thus attributing any difference to divergences between assumptions and actual economic developments.

There is no obligation to follow the guidelines specified. However, if a notification of the risk premium to the supervisor does follow the guidelines, the supervisor will as a starting point not question the risk premium, and the supervisor will not ask for more explanations for the size and calculation of the risk premium. If a notification does not follow the guidelines, the supervisor will study the notification in order to evaluate whether the rules notified provide assurance and fairness to the insured.

Thus, as a starting point it is expected that the guidelines are capable of establishing the transparency and comparability called for. The majority of institutions have chosen to stay within the rules and procedures in the guidance.

The notification must be in place before the beginning of the accounting year. Among other things it must (on a comparable basis) be specified how much extra return could be awarded to the insured, if the equity was not rewarded with a risk premium. The company must specify the assumptions behind the calculation of the risk premium, into:

- Risks which are not specific to the company in question.
- Risks related to the business plan and strategy etc. for the specific company.

The first category includes financial risks, biometric risks and risks relating to cost assumptions. If, for example, a company has issued contracts over the long term, guaranteeing life-long benefits, this might expose its equity capital to a relatively large risk when life expectancy increases (compared to a company where increasing life expectancy might lead to reduced benefits). Risks in the second category could be risks relating to the investment strategy and reinsurance program, etc.

The notification must also specify the amount of the equity risk premium that will not be transferred to the equity capital because the result realized is not expected to be sufficient (a larger part to owners than to policyholders may only be distributed to own funds, when this larger part plus the amounts distributed to the insurance portfolio can be covered by

positive realized results for the year. If the realized result for the year is not sufficient to allow distribution to own funds of the part of the realized results warranted by the principles of calculation, the company may rectify the situation in future years if the realized results permit this).

In the course of a given year a company is not allowed to change the principles and assumptions governing the calculation of the risk premium, if it is to stay within the scope of sufficient market discipline. However, at the end of each year the notification to the supervisor must be renewed, i.e. the company must consider whether a notification - and the arguments for the size of the equity risk premium - already in use are still applicable.

No later than eight days after board approval of the way in which a given year's realized result will be allocated to policyholders and equity, the company must notify the supervisor as to the *actual* realized risk premium awarded to the equity. Hence, the expected and actual risk premium to the equity can be compared and any difference explained.

#### **J. Evaluation of Experience with Guidance on Market Discipline**

The risk premiums to the equity and Special Bonus Provisions are made public by the supervisor (on the supervisor's home page).

Experience is still quite limited as to whether the intentions of the guidance on market discipline - to force companies to consider the risks they are facing and to enable the market to discipline the size of the risk premium attributed to the equity - are actually reached. The rules have only been applied for a few years, and they have been amended a couple of times.

It is clear, however, that it is difficult to really introduce transparency into the complex issue of how to calculate a reasonable reward to the risk of the equity in life insurance companies and pension funds. Many factors influence the size of this risk, and different companies have different strategies for the risk premium.

So many companies are active in the market that even the seemingly easy task of presenting an overview of the rules and assumptions for calculating the risk premium across companies poses practical challenges. However, such practical difficulties can be overcome for those really interested in understanding the issue of risk premiums across the industry.

Consumer interest in this issue is very limited for obvious reasons. Pensions are difficult to understand and technical issues, such as equity risk premiums, are not an issue which attracts the attention of the average consumer.

Instead, the question of fairness as to the allocation of the realized result between policyholders and shareholders has been a hot issue both in the media and in the ongoing competitive struggle among the companies.

In the media, particular attention has been paid to those companies having notified relatively high equity risk premiums. Risk premiums have been compared across life insurance companies and pension funds, and those companies with relatively large risk premiums have been accused of allocating too much to shareholders, i.e., to breach the principle of fairness, which is the whole essence of the contribution principle. The claim has been that companies awarding high risk premiums to the equity are paying off shareholders with funds belonging to policyholders. The reasoning is that the risk premium is a payment (a cost) transferred from policyholders to shareholders, which must be taken into account when comparing costs across companies.

Care must be taken about this reasoning, however. Different companies and pension funds have different needs. Some companies are in no need to and do not wish to build up their available capital (to match the solvency requirement) through the profit and loss account. Other companies must make a return to external shareholders which over time is sufficient to attract shareholder capital. Others again are growing fast and wish to meet an increasing capital requirement through policyholders' own funds (Special Bonus Provisions), which in the guidance are treated like equity.

Moreover, the requirement that a risk premium may only be distributed to own funds, when this larger part plus the amounts distributed to the insurance portfolio can be covered by positive realized results for the year creates volatility in the risk premium. Amounts which the equity capital has actually earned but which it has not been possible to allocate to the equity because of insufficient realized results are transferred to a "shadow account". They are gradually released when future years' income (positive realized results) allow this. Hence, in a given year a part of the risk premium to the equity may come from earlier years.

The use of the shadow account is one reason why the risk premium allocated to shareholders in a given life insurance company or pension fund - and the consideration whether that risk premium is reasonable - must be seen over a number of years. The underlying volatility of financial markets, which shows up in the accounts under fair valuation, is another reason.

Finally, the risk premium is not a cost which is borne by policyholders and used for the remuneration of the equity. The risk premium is a payment to a factor of production - the capital at risk. The shareholders (including policyholders if they are contributing to the risk capital with Special Bonus Provisions) are contributing to the company being able to bear those risks which create an income that allows a risk premium to the equity. The risk premium represents an *allocation* of the realized result, not a transfer from policyholders to shareholders.

There is, however, no doubt that the guidance has served its purpose of forcing insurance companies and pension funds to consider the risk their equity is facing and what the price for running this risk should be. Over time and with forthcoming amendments to the guidance it may be expected that this important insight will also be introduced to other users of the guidance, not least the media.

Also, by relying on transparency and competition instead of strict quantitative limits on the risk premium to equity, the guidance on market discipline rests on a sound approach which is well in line with the approaches to risk, accounting and solvency which international bodies like the European Commission are aiming for in these years.

### **K. Market Values and the Choice of Discount Rate**

An important feature of the measurement of liabilities at fair value is, naturally, that future cash flows must be discounted. This raises the important question of the choice of an appropriate discount rate.

There was a lengthy discussion in the Market Value Committee on how the discount rate should be determined.

It was concluded that the discount rate should not reflect the actual asset composition of the individual pension institution. There should be only one discount rate, equal for all actors in the market. Given this conclusion it was debated whether the rate should be a so-called risk free rate of interest or whether it could include some kind of credit risk. In the latter case the discount rate would reflect the credit standing of a high quality bond.

Another conclusion was that the discount rate should be a market interest rate with the same term and in the same currency as the liability. In other words, the rate was to be based, in principle, on a yield curve, so as to ensure that in the discounting of future cash flows, the rate used was equal to the point (maturity) on the market yield curve that was equal, at the time of calculation, to the time period until the payment date for the payment in question.

At the time of the introduction of the new fair value accounting rules, pension institutions were not, however, immediately prepared to apply a maturity-dependent discount rate, nor were they able to do so in practice. Under the rules in force at the time, pension institutions had been using discount rates that were independent of the maturity of liabilities.

Against this background, it was made optional for pension institutions to decide whether to use a single rate (flat rate) or a maturity-dependent rate (yield curve) in the calculation of their liabilities.

The executive order on accounting implementing the new fair value rules stipulated that in the valuation at fair value of guaranteed benefits, “the rate used should provide an

estimate of the return obtainable in the market. The Danish Financial Supervisory Authority shall prepare a set of guidelines for the determination of this rate.”

The guidelines prepared in response to this provision made it optional for companies to decide whether to use a single rate (flat rate), determined in accordance with the provisions of the guidelines, or a zero-coupon yield curve.

While rules were established for the calculation of the flat rate, no rules were specified for the determination of the yield curve for companies opting to use a yield curve rather than a flat rate.

The flat discount rate was determined as the average of the yield on three government bonds weighted to ensure that their maturities correspond to 10 years – with the addition of a premium commensurate with the spread between a 10-year swap rate and a 10-year government bond yield.

The accounting rules also stipulate that an adjustment for risk and uncertainty must be made. According to the fair value accounting rules, this adjustment represents: “The estimated price premium which the company must be expected to have to pay in the market to an acquirer of the company’s portfolio of insurance contracts in order for the acquirer to take on the risk of fluctuations in the size and payment dates of the guaranteed benefits”. This adjustment for risk and uncertainty can be made in the form of a deduction from the discount rate corresponding to five percent.

The use of a government bond with the addition of a spread to the swap rate must be seen as a pragmatic choice, mirroring that the Danish rules for fair valuing liabilities first and foremost is a pragmatic response to assets being fair valued.

### **Introduction of a Yield Curve**

In the course of 2003 some pension institutions showed interest in applying a yield curve to the measurement of insurance liabilities. Some institutions changed their notification to the supervisor and stated their intention of changing from the simple method described above to a yield curve. However, in the guidance from the supervisor as to the appropriate discount rate, it was only mentioned that a yield curve could be applied, leaving the details for the institution in question to decide and to notify to the supervisor.

Hence, a situation could be foreseen whereby different institutions would apply different yield curves to their fair value measurement of liabilities. This was seen as a problem by the industry, because two different institutions with identical liabilities should recognize the same fair value of those liabilities.

The basic approach to the Danish fair value accounting rules was that companies should notify the supervisor about their best estimate concerning a range of factors influencing the fair value of liabilities - these factors include mortality, morbidity, costs etc. These factors are specific to the individual company, and the companies should compete to

control and reduce such risks. However, this line of reasoning is not valid for the discount rate. The discount rate is a factor, which should be the same for all life insurance companies and pension funds.

Therefore the trade association of the Danish life insurance companies and pension funds - the Danish Insurance Association - suggested to the authorities in late 2003 that rules governing the yield curve should be established. At the same time work was undertaken in order to make the Danish accounting rules so-called compatible with the accounting rules of the IASB, International Accounting Standards Board.

Hence, a special task force was established with the mandate "To consider the principles to be included in a Danish IAS compatible set of accounting rules for determining discount rates to be used in the measurement of insurance and pension liabilities. To make recommendations based on these principles, for rules for estimation of a yield curve to be used by Danish insurance companies and pension funds in the measurement of their insurance and pension liabilities. The rules should be prepared so as to ensure, in so far as possible, that similar liabilities are measured at the same value in different companies. To that end, the Task Force is to consider current rules of significance to the choice of discount rate in the measurement of insurance and pension liabilities".

The task force looked for guidance in the existing rules laid down by the IASB, but came to the conclusion that the existing accounting rules of the IASB did not provide enough guidance as to the rules governing the discount rate for measuring insurance liabilities.

In the end, the task force recommended a model after which the yield curve is determined based entirely on the euro swap rate – allowance being made, however, for the difference between Euro rates and swap rates in DKK. There was a consensus among the Task Force members that a spread should be incorporated to reflect the difference between the Danish interest rate level and the euro rate level. The spread should be determined with a view to ensuring that it is as current as possible; at the same time, it should not, in so far as possible, be susceptible to be influenced by individual Danish interests.

The advantage of the model would be that the yield curve reflects the most liquid interest rate market; thus the curve will not be influenced by individual Danish interest rates. There was also a consensus among the Task Force members that if, in special situations, the model chosen produces misleading statements relative to the Danish interest rate level, it should be possible for the Danish Financial Supervisory Authority to deviate from the model.

The recommendations from the task force were followed, and starting from 1st January 2005 the Danish supervisor on a daily basis started publishing the yield curve on its homepage. During a transitional period, the option remains to make use of the simplified method when discounting life insurance liabilities. However, as from 1 January 2009 all life insurance companies and pension funds must apply the yield curve (the yield curve is also applicable to non-life insurance companies to the extent that it is relevant to discount non-life insurance liabilities. This also applies to provisions for continuing benefits in

industrial injury insurance). The yield curve is delivered to the supervisor from the Danish National Bank, which has contracted with an international investment company to supply the underlying data and technical expertise to simulate the zero coupon bond yield structure.

The yield curve thus obtained includes a small credit risk (reflecting the swap market, i.e. inter-bank credit risk), however not to the extent called for by the insurance industry. The Danish experience gives no clear guidance as to the choice of applying a risk-free rate for discounting or a rate including some credit risk. The very notion of a risk-free rate is rather theoretical, and there is no single risk-free interest rate. In short, the Danish yield curve is close to a risk-free term structure.

The Danish experience shows first and foremost that the discount rate must be uniform across the industry and secondly, that it is possible to estimate a zero coupon bond structure and make it available to the market on a daily basis.

#### **L. Treatment of Risk and Uncertainty**

As mentioned it was possible to apply a standard deduction of five percent from the discount rate in order to take into account risk and uncertainty in terms of cash flows. There was a consensus among the Task Force members that the size of the premium for risk, uncertainty and the value of guarantees should, in principle, be assessed and justified by each company and that the premium should be taken into account in the cash flows, rather than as a deduction in the discount rate. The Task Force members therefore proposed setting a time limit on the possibility of applying the five percent standard deduction.

This proposal has been followed by the supervisor. The new accounting rules do not contain the five percent deduction method - the companies may still notify that the five percent will be applied, but now they must argue in the notification why this is appropriate. Moreover, the deduction does not have to take place in the discount rate, but could be applied to the cash flow, which is to be discounted. This represents a further move toward refining the life insurance accounting rules in the direction of "real" fair values. Whereas the discount rate should be uniform across the industry, this is not the case for the premium for risk and uncertainty.

#### **M. The Traffic Light System**

The traffic lights system was introduced by the supervisor 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 percent) on the share of risky assets.

The stress testing is divided into two scenarios: Yellow Test and Red Test. When a company does not fall into one of those 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 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 unlikely, 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 rather unlikely scenario (yellow light) poses capital problems.

The stress test is composed of the following assumed market developments:

### **Asset Risks**

#### ***Interest Rate Risk***

<b>Interest rate</b>	<b>Red Test</b>	<b>Yellow Test</b>
<b>Short Duration &lt; 1y</b>	up/down 1.0% point	up/down 1.43% point
<b>Med Duration 1y &lt; 3.6y</b>	up/down 0.85% point	up/down 1.18% point
<b>Long Duration 3.6y &lt;</b>	up/down 0.7% point	up/down 1.0% point

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.

#### ***Shares***

In the Red Test shares drop by 12 percent in value; in the Yellow Test by 30 percent.

#### ***Credit Risk***

The credit risk is measured by applying credit risk weights on the different categories of bonds. 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.

#### ***Currency Risk***

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

#### ***Default Risk (Derivatives)***

The risks on derivatives are calculated by using the market value multiplied by a weight depending on type and duration and finally multiplied by a factor *a*. The factor *a* depends on the classification of the security issuer.



### **Risks in Subsidiary Companies**

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

### **Risks Associated with Real Estate Properties**

Real estate properties are measured at market value according to accounting standards. The Red Test implies a decline of eight percent in value, the Yellow Test 12 percent.

### **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.

### **Liability Risks (Insurance Provisions)**

The liabilities are treated differently from the assets since 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. The Red Test is up/down 0.7 of a percentage point and the Yellow Test up/down 1.0 percentage point. The risk in liabilities (insurance provisions) is defined as the difference in their level between before and after stress testing.

### ***Calculating the risk on assets***

The total risk of assets is obtained from the total by choosing the worst scenario in both Red Test and Yellow Test.

### ***Distribution of risk to the bonus reserves***

This is made in accordance with the contribution principle.

### **Calculation of the excess Capital Base is made in the following order:**

- i) Deriving the Capital Base after distribution of risk
- ii) Deducting the solvency margin of the Insurance Provisions before Stress Test adjusted for four percent of the change in the risk of the provisions in either Red Test or Yellow Test.
- iii) Adding three percent of the Insurance Provisions before Stress testing.

The calculations above will eventually yield the Excess Capital Base.

## **N. Evaluating the Traffic Light System**

Soon after the introduction of the scenario testing in the Danish life insurance and pension business, financial markets were hit by severe turmoil for several reasons. Life insurance companies and pension funds had to register huge losses on the shares in their portfolios. Likewise, the fall in interest rates to unprecedented levels created problems, because the dominating proportion of contracts outstanding were written with a guaranteed rate of return.

In this situation, a large number of institutions were in the yellow light and some were in the red light - for one company the situation turned out to be so severe that it encountered real problems in fulfilling the solvency requirement, and it was taken under special supervision by the authorities.

A dilemma exposed itself in this time of critical market developments: shares had been falling in value and interest rates were at historically low levels - yet besides the official solvency requirement, pension institutions also had to test their capital base against a further worsening of the financial markets. Clearly, life insurance companies and pension funds had to reduce their risks - selling shares and buying financial instruments covering the risk of further declining interest rates - but was it justified in times of severe financial distress to test the capital base against the possibility of further negative market developments? Were not the traffic light scenarios imposing unwarranted and unnecessary restrictions on life insurance companies and pension funds?

Under the old accounting rules the solvency problems would not have revealed themselves as it happened under the fair-value accounting rules. And the claim was made that the former accounting rules - and, hence, also the former solvency measurement - would have made the life insurance companies and pension funds better able to take a long-term view on their asset allocation against their liabilities. The former rules would not have forced the companies to sell risky assets in a falling market. In other words: would it matter in a time of severe financial distress that a life insurance company or pension fund became insolvent measured by today's market values, if the money to be paid out was due in 20 or 30 years, long after the financial crisis was gone?

There was a lengthy debate on these crucial issues. And this debate is at the heart of fair-value accounting: does it make sense to base the capital assessment, including stress testing, and the value of liabilities, on today's values in a business, which in its nature is as long term as life insurance and pension business?

There is no single answer to this question. But the Danish argument would be that the apparent solvency protection under traditional accounting rules would be artificial. Transparency and insight into the underlying economic situation of life insurance companies and pension funds is provided by market valuation. However, the interpretation of market values and the need for supervisory action when applying fair-value accounting must be carefully considered.

In times of financial turmoil - falling share prices - less weight should be put on current market values than under normal market conditions. After all, at least in the Danish case, pension institutions are so influential on capital markets that a general intention on their part to reduce their risk would only add on to the financial turmoil (share prices would only fall further).

Evaluated against experience the traffic light system in Denmark did a proper job in forcing life insurance companies and pension funds to consider the risks to which they are exposed. The proportion of shares in the portfolios of pension institutions was

reduced and financial instruments were bought in order to provide cover against further declines in the level of market interest rates.

Moreover, the supervisor seems to have acted very reasonably to the results of the traffic light stress testing. Companies facing the red light seem to have been asked to reduce their risk. However, the supervisor has not interfered with management decisions and has not forced the selling of specific assets. And companies in the yellow light seem to have been able to rectify the situation without undue intervention from the supervisor.

As such, the traffic light system of stress testing seems to have created better awareness by the management of life insurance companies and pension funds of the risks they are facing. The traffic light system is being improved on an ongoing basis, yet it seems today to actually influence the monitoring of risks in the insurance business. Moreover, the traffic lights have pushed towards the increasing trend of relying on products with lower or no guaranteed return.

So far, the stress test deals only with financial risk while underwriting risk is not included. However, in an annex to the annual accounts information must be given on the impact of possible adverse developments in underwriting risks, and this information comes quite close to resembling the stress test. It is possible that underwriting risk will be included in the stress test at a later time.

## **O. Risk-Based Capital Requirements**

The system of stress testing in Denmark is another example of the Danish regulatory rules being forward looking. In the future European solvency regulation, known as Solvency II, it is emphasized that stress testing will be an important part. While the introduction of the stress test gave rise to some tension between the supervisor and the industry, the stress test today - after some modifications - is seen as relatively pragmatic and supportive to the overall risk management.

The use of stress testing is also well in line with a risk-based approach to solvency regulation. Companies are allowed to hold large amounts of risky assets like shares if their capital base supports those assets. And companies, which have covered the guarantees they have issued with financial instruments - as many have in recent years - see their hedging activities reflected in the results of the stress test.

The Danish regulation concerning the use of financial instruments, by the way, is also forward looking. Only the general rule applies that financial instruments may be taken into use as long as they serve to reduce the total asset/liability risk.

In many ways the Danish life insurance regulation is already to some extent risk based. And the supervisor's approach to solvency regulation is that it should be risk based. The supervisor would like to introduce lower capital requirements than today's requirements in cases where this would be reasonable, measured against the use of financial instruments, prudence in asset allocation, and offer of guaranteed returns. However, as

mentioned earlier, the solvency requirements as laid down in the EU directives are not risk based.

One important change is considered within the limits set by the EU directives. As mentioned in section 3.3 the so-called bonus potential on paid up premiums may serve as a buffer to absorb losses when certain conditions are met. But the bonus potential on paid up premiums forms part of the technical provisions against which the capital requirement is calculated. The question has been raised why a capital requirement is enforced against a liability item which serves as a buffer to cover losses.

Currently the supervisor is considering leaving the potential on paid up premiums out of the technical reserves when calculating the solvency requirement, a change that is within the scope of EU regulation. If this change is implemented, it will lead to lower solvency requirements for those life insurance companies and pension funds which have issued contracts with relatively low levels of guaranteed returns - hence, it would reward companies facing relatively low risks. Clearly, this would be a further step toward risk-based capital requirements.

The supervisor has stated that a change in this direction would be followed by a requirement for every life insurance company and pension fund to evaluate and report to the supervisor the capital requirement which the company itself would deem appropriate - a so-called "individual capital assessment". This has already been introduced for banks.

Such a requirement will most likely also become part of the Solvency II requirements.

## IV. EFFICIENCY OF RISK SHARING ARRANGEMENTS

### A. Introduction

Like multi-pillar systems in other countries, the three pillars of the Danish pension system differ regarding the risks borne by members (active workers and pensioners), pension institutions and the government. One of the fundamental advantages of multi-pillar systems is that they spread the relevant risks widely. This section discusses the efficiency of risk-sharing arrangements in Denmark, with particular focus on the distinguishing characteristics of the Danish system.

When assessing the risk sharing arrangements of a pension system, the risks borne by active workers and pensioners are usually analyzed separately. But in the Danish case, the risks of the two groups are analyzed together because of the specific features of such arrangements in Denmark. This applies to the risks borne by members in pillar II and III schemes, which are fully funded and based on defined contribution plans. Risks in pillar I, which is an unfunded "pay-as-you-go" scheme, differ between active workers and pensioners.

### B. Risks Faced by Active Workers and Pensioners

The main risk facing the first pillar of the Danish pension system is political. This is the risk that the authorities may lower the level of the social pension (and the supplement which, as discussed above, is received by a large number of pensioners) either by lowering the pension amount in nominal terms or, more likely, by failing to maintain its real value relative to changes in prices and wages.

This risk may be subdivided into two: a pure political risk and a financial risk. The first relates to the risk that pension amounts may be lowered in the future because of a political decision to diminish the role of the state in the socioeconomic sphere and reduce the level and reach of social payments. The second relates to the risk that the cost of the unfunded social pension and its supplement may become unduly onerous because of the rise in the system dependency ratio from the combined effect of declining fertility and increasing longevity. In the period until 2025 it is expected that the number of people older than 64 years will increase by more than 40 percent while the number of people in the working age between 18 and 64 years will decrease by five percent. Thus, even without any change in political orientation, a reduction in the level of benefits may become necessary.

In well-governed countries, like Denmark, the risk of abrupt changes to pension benefits for people, who are already retired or are close to retirement, is small. Adjustments may be made in the level of benefits of future generations to cope with the impact of growing longevity, although such changes may not represent a reduction in total retirement benefits but rather an attempt to contain an inexorable increase in the total cost of such benefits because of the demographic changes. Nevertheless, a decline in promised

benefits represents a risk for future pensioners even if it is a response to increasing longevity.

In the funded pillars, the main risks facing active workers and pensioners are financial and insurance risks. In a typical funded plan, workers face three types of risk. The first risk is the investment risk during the accumulation phase of the plan, i.e. the risk that returns will be low and workers will fail to accumulate sufficient capital for the generation of adequate income in retirement. The second risk is the annuitization risk, the risk that at the time of retirement long-term interest rates will be very low and will produce a low annuitized income - most directly recognized when the accumulated capital is converted into an annuity. The third risk is the inflation risk faced during the retirement life of a member and this occurs when the regular pension income is fixed in nominal terms and is not adjusted for inflation.

The main insurance risks are the risk of early death and the need to provide for the surviving dependents of insured workers, the risk of disability, and the risk of longevity, which implies the need to ensure that workers do not outlive their accumulated savings.

Naturally, the trend towards pension savings taking the form of phased withdrawals instead of annuities poses a risk to the pensioner in times of increasing longevity. The heavier reliance on phased withdrawals gives more freedom of choice to the individual to decide upon the pattern of consumption over time, but also introduces the risk of very low income in the late stages of life.

In Denmark, the risk-sharing arrangements of pillar II and III schemes have the result of aligning the interests of active workers and pensioners. The investment, annuitization and inflation risks are all mitigated by using contracts that specify minimum guaranteed rates of return for both the active and passive phases of contracts and by setting annuity conversion factors many years ahead of the time of annuitization. Insurance risks are also mitigated by pooling death, disability and longevity risks.

A central feature of the Danish approach is the low level of guaranteed benefits for new contracts. The level of actual benefits is adjusted by the declaration of regular bonuses. These reflect both the financial and the underwriting performance of underlying schemes. Effectively pension institutions use a combination of nominal and variable annuities with the benefits on the latter reflecting both investment performance and longevity experience.

A major risk for both active workers and pensioners is that pension institutions will not be able to deliver the guaranteed benefits. Effective regulation and supervision, emphasizing a risk-based approach to capital and asset/liability management, aims to ensure that pension institutions are not only able to meet their contractual obligations but achieve a level of performance that provides adequate total benefits to members and policyholders. However, the risk of low returns and benefits, because investment guarantees necessitate strategies favoring safe but low-yielding assets, has stimulated a growing demand for products without guarantees or with a lower level of guarantees, but

a greater potential for higher returns. The growing use of phased withdrawals, which do not cover the longevity risk, may reflect a demand for greater financial flexibility by Danish workers and for a lower level of longevity insurance than is provided on a combined basis by the social pension system and the guaranteed products of the annuity elements of the funded pillars.

Another risk concerning the traditional guaranteed products is the risk of a systematically biased or distorted distribution among different generations of insured workers. Application of the so-called contribution principle, discussed in the preceding chapter, aims to alleviate this risk.

Members of funded pension schemes face some political risk from future changes in the taxation of retirement saving and investment income and from a compulsory direction of pension fund investments into low-yielding assets. The latter would represent an indirect method of taxation, but would be out line both with past experience and with Danish as well as European legislation.

### **C. Risks Faced by Pension Institutions**

In the Danish pension market the private providers of pension products include commercial insurance companies, insurance companies established and owned by labor market organizations, multi-employer pension funds operating under the legislative and regulatory regime as life insurance companies, and - playing a marginal role - corporate pension funds.

The main risk for all suppliers is a normal commercial risk related to any provision of private services. In this respect the pension market does not differ from any other market. In the present situation there is a very high certainty of a stable and even increasing demand, but competition might lead customers to choose another supplier. This is mainly a risk faced by suppliers of individual pension insurance, but suppliers of occupational pension schemes face a similar risk that a scheme may collectively decide to transfer its business to another supplier. Examples have been seen in the market.

In addition to this ordinary commercial risk, pension institutions also face the political risk that their operating environment may change drastically over the long life of the guaranteed contracts they offer, without having the ability to adjust the type and level of guarantees toward their customers. An example of this risk could be changes in the taxation of investment income making the offer of pension guarantees more risky for suppliers. Another example could be drastic changes in prudential regulations, involving an increase in capital requirements and/or a significant rise in operating costs.

Other risks for pension institutions concern the pension guarantees and with profit products. The guarantees are based on the total of technical insurance elements: interest rate, insurance risks and costs. The risks concerning these elements are correlated in the way that a surplus in one element reduces the risk in the other elements and a deficit increases the risk in the other elements. The fact that the guarantees concern the benefits

in total and not the single technical element should be remembered when reading the following observations regarding financial market and insurance risks.

The main financial market risk is the risk of declining interest rates. As long as the market interest rate remains in safe distance above the minimum guaranteed rate, the risk of falling markets rates only affects the declaration of bonuses and is thus borne by customers. However, when market rates come very close or fall below the guaranteed levels, pension institutions face a serious risk of capital erosion and even insolvency. Most suppliers have chosen during the last five years or so to cover their market risk through an extensive use of derivatives, especially long swaps in the more developed and more liquid euro market.

A mismatch of the duration of assets and liabilities forms a special challenge for the companies. As a general rule, the duration of liabilities is much longer than the duration of derivatives available on the market. It is worth noticing that the asset liability management is totally based on market conditions. The Danish government does not in any way try to supply the market with long-term instruments dedicated to close the duration gap between assets and liabilities.

There is a market risk from falling interest rates as well as from rising interest rates. This is due to the fair value accounting rules, according to which the assets are valued at market prices and the liabilities are valued at estimated market prices. The capital loss of assets caused by an increase in the interest rate is not offset by a capital gain of liabilities, since according to the accounting rules the decrease of the reserves for guaranteed pensions is balanced by an increase in the required reserves for future bonuses. However the change in the composition of liabilities with heavier reliance on bonus potentials when interest rates increase creates a loss absorbing buffer. Therefore, the risk of low or falling interest rates is more pervasive due to the guaranteed benefits built into most contracts.

An additional complication arises from the extensive use of assets by Danish pension institutions that have embedded options, especially in the case of mortgage bonds. These allow borrowers to refinance their mortgage loans at a pre-set price when rates are falling and deprive pension institutions of high-yielding assets when the value of their long-term liabilities increases because of the fall in market interest rates. However, this is a basic financial market risk that requires pension institutions to adopt sophisticated asset liability management practices that are commensurate with the financial sophistication of the products they sell and the assets in which they invest.

The insurance risks – such as longevity, disability and early death – are shared among insurance providers and the insured. As long as the realized result is better than the assumptions made for the technical reserves, changes will result in higher bonuses; thus the risks are on the side of the customers. But if the realized result turns out worse than assumed for the calculation of technical reserves, the risks are borne by providers.



#### **D. Risks Faced by Government**

The risks faced by the government concern the first pillar as well as the second and third pillars. The social pension can in principle be changed at any time by a majority of the parliament. There is no formal obligation for the government to maintain the real or nominal value of the pension benefits of the first pillar, not even for the current pensioners. However, the pension rights of citizens are politically a very sensitive area and thus in reality the social pension system is politically very difficult to adjust.

The government has no formal, legal obligations for the private pension schemes of the second and third pillars. Hence the risks for the government regarding the pension system are not related to legally binding obligations. They are of a purely political and economic nature.

The main political purpose of the pension system is to secure an acceptable standard of living for the old and disabled segment of the population. Goods and services to provide the acceptable standard of living for pensioners have to be supplied at any time by current production (together with accumulated net foreign assets). Although future levels of production may increase through an accumulation of domestic and foreign assets and through increases in productivity, current pensions must be financed from current production in a socially and politically acceptable way. The progressive aging of the population poses a serious challenge that is further aggravated by the growing demand for health and old-age care services.

The first risk for the government is the risk of social poverty that would occur if some old people, who have not saved for a pension, would be left without any public support. The role of the first pillar of the pension system is to deal with this risk. The first pillar of the pension system provides every Danish citizen a social pension and a pension in the case of disability. The social pension is relatively low, but is adequate to support the basic needs of life.

The second risk for the government is the risk of social unrest, if a large number of pensioners faces a major decline in living standards compared to the standards during their working life. The second and third pillars of the pension system provide Danish citizens with an opportunity to secure a pension that reflects the level of income during their working life. Participation in the second and third pillars is not compulsory by law. But the government provides incentives for pension saving, in the form of both tax incentives and legal restrictions that require the use of accumulated savings for pension purposes.

A third risk for the government is a low saving rate. With too low savings, the external balance of the Danish economy could again become a problem, as it was during the last decades of the last century. Too low a saving rate would severely increase the economic problems caused by the aging of the population. The three pillar pension system copes

with this risk by promoting the growth of fully funded pension schemes. All pension schemes in the second and third pillar and part of the first pillar are fully funded.

In principle this should not influence the total saving rate in a country with a highly developed and well functioning capital market, such as Denmark. With full access by households to increased borrowing, an increase in pension savings could be neutralized by a decrease in other private savings. But the fact is that especially the growing participation of lower income groups in pension schemes since the beginning of the 1980s has had a positive impact on the private saving rate.

Tax rules have added to this impact. Pension premiums are in general exempt from income tax, while pension benefits are subject to tax. The deferral of income taxation is not only encouraging private saving; it is also moderating public expenditure by diminishing the present tax base.

A fourth risk for the government is financial instability caused by lower fiscal income and increased public expenditure as the population grows older. The pension system contributes to avoiding this risk. The taxation of pension savings - pension premiums being exempt from income taxation and pension benefits being taxable income - transfers the taxation from the time of income - the working period - to the time of consumption - the pension period. The development of the tax base is thereby brought in better alignment with the expected need for public expenditure.

In a pension system based on private savings and insurance it is more difficult for future politicians to influence or to change the level of pension for future pensioners than in a pension system based on pay-as-you-go financing. This quality of a funded, insurance pension system has a number of advantages. For the working population of today - the future pensioners - it transfers the political risk of a pay-as-you-go system that is that the future working population will not be willing to pay the taxes needed to finance the future pensions, into a market risk, that is the risks of low interest rates, bankruptcy of the pension providers, etc.

In the present situation with a growing number of pensioners the increase of the part of total income and consumption opportunities that needs to be distributed to pensioners is more likely to be accepted via the market - that is via ownership of capital - than via political decisions. The theoretical risk of too high future pensions can still be avoided through taxation, for instance through taxation of the investment income of the pension schemes and through taxation of pension benefits.

In addition to these political risks the funded and insurance based pension system creates another risk for the government: the risk of bankruptcy of the pension providers. To minimize this risk the Danish insurance companies and pension funds are subject to very tight public regulation and supervision. If a pension provider were to become insolvent, the Danish government has no formal or legal obligation to secure the pensions of the customers of the provider. Nevertheless, even though there has been no practical experience of insolvencies in Denmark for the last eighty years, it is generally agreed that

should an incident like this occur some time in the future, the government would have to consider an intervention. If the consequences for the customers and probably especially for the actual pensioners are considered politically unacceptable it is presumed that the political system will have to solve the problem.

## V. CONCLUSIONS AND LESSONS FOR OTHER COUNTRIES

In many ways and at various levels the Danish pension system is robust and well designed. The system has some strengths and advantages which could serve to inspire other countries that for some reason are in the process of reviewing their pension system.

First and foremost the Danish pension system provides a basic cover for pension needs to practically speaking the entire population. This is done through the tax financed pay-as-you-go schemes in pillar I and supplemented by the ATP, which - although not being a part of the public welfare system - shares characteristics with public, social schemes. The broad coverage ensures that pensioners do not end up in poverty, even if they have insufficient private savings.

The basic state pension is at a relatively low level considering the Danish income level in general, but on the other hand the state pension is given at a flat rate irrespective of previous earnings. Rights to the basic pension are earned through citizenship and residency and not through any previous relation to the labor market. For people who have been on low incomes before retirement, the state pension together with ATP does act as a reasonable safety net.

Second, the Danish pension system has a multitude of pension institutions providing pillar II schemes. These represent funded pension schemes which have been negotiated as part of labor market agreements. Over the past 20 years or so these schemes have been widened to almost 80 percent or more of wage earners, who contribute 10 percent - and often much more - of their salary for pension purposes. The schemes are fully funded and the obligations to provide future pension incomes are isolated from the companies where the employees earn their salary. Risk sharing, therefore, does not involve the companies of the employees. This is a very important advantage compared to the pension systems of many other countries.

Due to the fully funded and defined contribution nature of pillar II schemes the system provides a high degree of mobility of pension rights. Thus pillar II schemes do not cause any distortions to labor market mobility.

Within the schemes the members are to a large extent sharing risks based on solidarity, e.g., the unisex principle is mandatory and health conditions etc. are taken into account only to a minor degree upon entering the schemes in pillar II.

Third, in pillar III each individual has the possibility to align his or her intentions for the future life as a pensioner with the present income stream and to purchase additional cover in the case of early death or disability.

By relying on these three pillars the Danish pension system combines the strengths of each pillar, while limiting their weaknesses - for example the tax financing in pillar I schemes does lead to some economic inefficiency (through the creation of tax wedges). However, this problem would be much more severe if the pension system was totally

based upon pillar I. There seems to be great support for the additional pension provision in pillar II and III, and over the years a large proportion of pay rises has been used to increase pension contributions in pillar II.

The funded nature of pillars II and III also strengthens the trust in and support of the system. Clearly there is a risk that future pension income could be taxed more heavily than foreseen when contributions were made - however, the real values of any promise of future pension income is dependent upon the size of future real national income (production). The Danish case provides some evidence that funded pension schemes are able to gather support among the working population and pensioners and probably more so than a system relying more heavily on future tax payers to provide future pension income.

Over the coming 20 to 40 years many Western European countries will experience quite dramatic demographic changes, where the proportion of pensioners will increase sharply in relation to the number of people in working age. This is bound to put upward pressure on public expenditures and taxes, in many cases to a degree which is deemed unsustainable.

This demographic challenge to the economy will also make itself felt in Denmark. However, the organization of the pension system with a broadly-based and fully-funded private pension system, supplementing the public system, makes the Danish economy less exposed to the challenge. Or, in other words, the strain on the public finances would have been much more severe without the private pension system.

The Danish government set up a Welfare Commission which was assigned the task of analyzing the challenges posed by the demographic changes to come. A report from the Commission with proposals for welfare reform was presented in early December 2005. In the report the Welfare Commission expressed support for the three-pillar pension system highlighting the balancing of risks and merits of the different pillars. As part of a comprehensive reform proposal the Commission suggested to consider the introduction of some obligatory pension savings for people falling outside the scope of the present pillar II and III. It also suggested to consider expanding the incentives to rely more on annuities as the preferred payout method.

In April 2006, the Danish government presented its proposal for welfare reforms to cope with the demographic changes over the next decades. The proposals clearly have as their starting point the recommendations of the Danish Welfare Commission, although the proposals of this Commission were more all-encompassing into all aspects of the welfare system than the government proposals.

The aim of the government proposals is to make the Danish economy and the Danish welfare system more robust against the longer term challenges. A key objective is to raise the average age of retirement. Key proposals in this area are to raise the rate of possible early retirement from 60 to 63 years and to raise the official retirement age from 65 to 67 years. These reforms are only intended to affect people presently under the age of 50,

hence the changes will be phased in gradually. The basic pension system - based on the 3 pillars and with the private system supplementing the public one - will remain a cornerstone of the welfare system and as a means of protecting the incomes of future pensioners. If carried through, the reforms could strengthen the incentives to save for pensions under pillars II and III.

Political discussions on the reform proposals are to be finalized before the summer 2006. There seems to be rather broad political consensus on the overall reform objectives.

Contributions to pensions in pillar II and III are income tax deductible but benefits are taxed when paid out. Through pension contributions, individual tax payments become more directly related to lifetime income and consumption possibilities than to income in the active working years.

Since Denmark applies a system of progressive taxation, this implies that the total tax burden is reduced through pension contributions - on the important assumption that tax rates are kept unchanged over time. This has certainly not been the case when a longer time span is considered. However, there is some merit to the tax burden reflecting lifetime consumption possibilities - instead of present income - no matter what happens to the average tax burden.

In contrast to many other countries the current investment yield obtained in life insurance companies and pension funds is taxed in Denmark. The rate of tax is 15 percent no matter whether the yield represents interest yield, stock return or other investment income.

The application of taxation to the current yield reflects that Denmark is a high tax country. Investment income from sources other than pensions is taxed with no less than 33 percent and up to almost 60 percent. Moreover, negative interest income (interest on loans) is tax deductible at a rate of 33 percent. Hence, if investment income in pension institutions were not taxed there would be room for tax arbitrage (or limits would have to be imposed on contributions to pension schemes). The present system does not invoke tax arbitrage to a large extent and still provides a reasonable tax incentive to save for pensions.

When looking closer into the features of the private pension system in pillar II and III the growth rate and dominance of pillar II is remarkable. Moreover, the preference by the Danes for the risk sharing and solidarity features of life insurance companies and pension funds - as opposed to more simple savings vehicles in banks - deserves attention.

In Denmark, the demand for pension benefits has for several years been concentrated on contracts with some kind of built-in guarantee for the future benefits. Pension institutions have issued contracts with guarantees, which imply that over time a certain investment yield must be obtained. In order for this system to work, reserves are built up in years of high investment yields, and these reserves are used in years with lower or negative yields to smoothen out the increase in the benefits of the policyholders. Over time, each policyholder will obtain a market yield, but the smoothing of yields between

policyholders and over time has been seen as an integral part of the risk sharing mechanism.

This system has come under strain in recent years because of falling interest rates and turbulence on the stock markets, not least after the September 11 events in 2001. When life insurance companies and pension funds have guaranteed future benefits, they are not able to optimize the long-term relationship between expected returns and benefits. The cost of the guarantees attached to traditional pension products in terms of lower average yields, therefore, has been widely recognized in recent years.

Hence, new products with no or very limited guarantees have gained market share. The products include unit link insurance, but product development is taking place at a rapid pace. New products, which fall between unit-link insurance and more traditional products (in the Danish market), seem to be entering the market with great success.

The growth of products with no or limited guarantees - based on the yield obtained being attributed to policyholders in each year - also satisfies wishes expressed by politicians. They want the pension market to become more transparent for the individual. Whether this is also a consumer need - not least considering the long-term nature of pensions and the importance of providing pensions for future generations instead of merely achieving short-term individual influence on asset allocation - remains to be seen.

The increasing market share of new products also reflects a market trend toward more freedom of choice for the individual. This trend has been seen for many years regarding individual choice of benefits of insurance coverage. Thus the widow's pension used to be a mandatory part of an ordinary occupational pension scheme. But today the widow's pension can be chosen individually by members of many occupational schemes. In recent years this demand for more freedom of choice has widened to include individual influence on the investment policy. Therefore the increased market share of new products can also be seen as a demand for individual freedom of choice.

There is a move toward more flexibility in the menu of retirement products. This represents a move toward more variable annuities (like in unit-linked products) and more combinations. The political authorities and legislators have promoted these trends and the resulting decline in the share of guaranteed products. This has been possible not least because the Danish pension system contains first pillar benefits that provide protection against longevity and market risk.

Like in every other country the activities of life insurance companies and pension funds are tightly regulated. The Danish supervisory system and regulation has elements which must be considered as quite forward looking. The accounting regulation is based upon market valuation of both assets and liabilities. In such a market-value-based environment there is no distinction between unrealized and realized gains and losses - they all go through the profit and loss account, they are being taxed, they are distributed to policyholders and shareholders, and they account equally for solvency purposes.

Especially the application of market accounting rules on the liability side is a major Danish achievement and should serve to inspire many other countries.

The accounting environment serves to strengthen and buttress the risk-sharing features of life insurance and pension business in Denmark. All gains and losses are recognized and shared between policyholders and shareholders - and among policyholders - according to the contribution principle. The accounting framework prevents gains and losses from being hidden and reveals the underlying risk profile of the different contracts.

Risk sharing is, therefore, quite transparent in the Danish system. It is not possible in the Danish system to hide liabilities and losses through artificial accounting measures or to turn over the risks to third parties. The impact of positive and negative market events is shared between policyholders and shareholders, thus not imposing strain on other actors in the economy.

The well-developed risk-sharing mechanisms and reliance on funded schemes in pillars II and III also imply that issues which are very important in many other countries are less important in Denmark. The funded system, coupled with the use of market values and market-based information requires, for instance, that changes in longevity (and other factors) must be taken into account and considered. When longevity increases, the actuaries must assure that liabilities are adjusted properly, and the technical assumptions governing the pension products must be reconsidered. Hence, the system provides incentives and requirements to react when important underlying factors change.

This is not necessarily the case in unfunded pillar I schemes which are subject to political decision making. Changes in longevity will only over a longer time span require political intervention. Therefore, the pressure on politicians today to secure the long term sustainability of the public pillar I pension scheme is limited. The risk is, therefore, that the need for such changes may be hidden for years. This is less likely in pillar II and III schemes. While the public pension system does not run an insolvency risk like schemes in pillar II and III there is a risk of intergenerational conflict inherent in the public pension system.

The regulatory framework governing the private pension system has over the years been gradually changed. Today, the supervisory focus is on gathering market-based evidence and strengthening incentives to control and monitor risks. Also, market discipline is being enhanced through the release of market-based information. Market forces and market discipline, emphasizing the responsibility of management, is seen as more effective than regulation through laws, limits and requirements. Although regulation is in many ways quite intense - also seen from a cost perspective - the basic premise to rely on incentives, risk control, and management responsibility must be seen as a major advantage of the Danish pension system.



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