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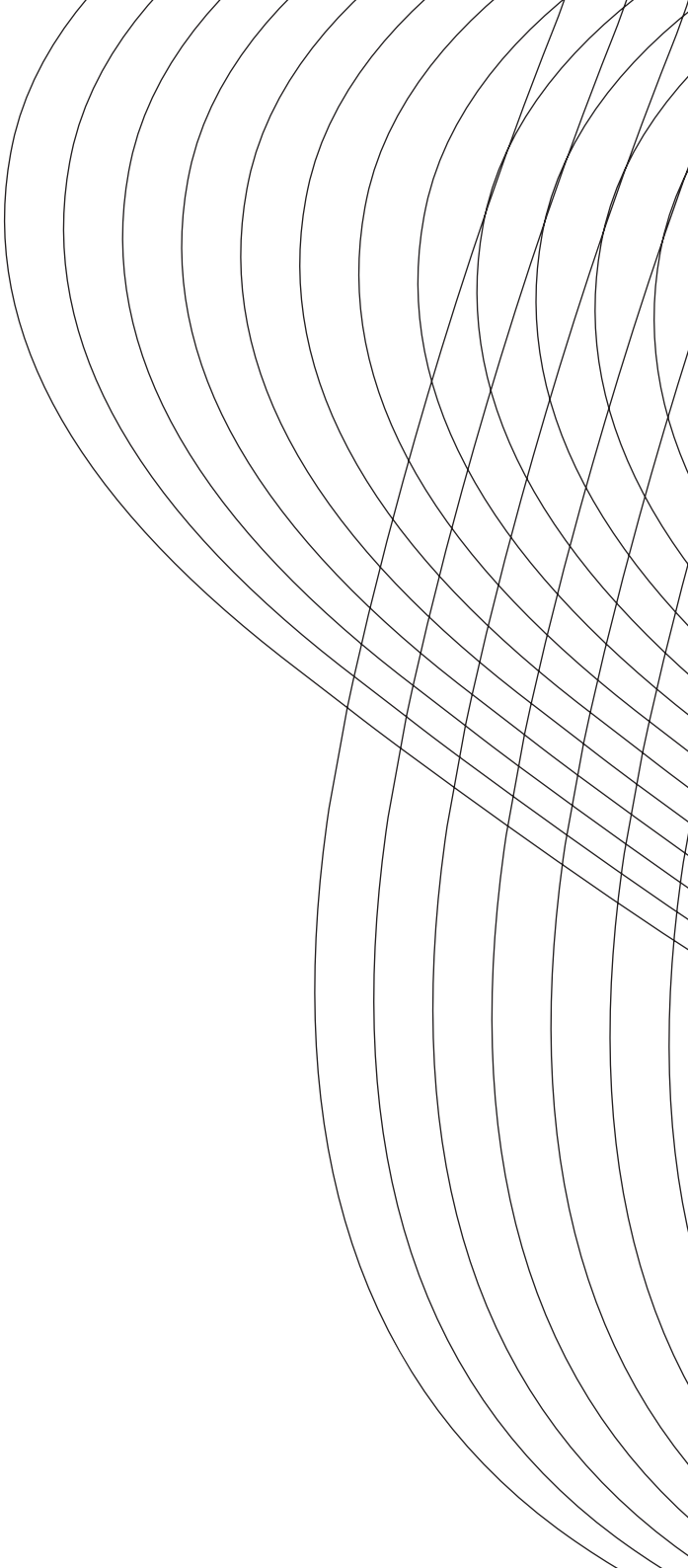
Network for Studies on Pensions, Aging and Retirement

Netspar DESIGN PAPERS

Dirk Broeders, Niels Kortleve, Antoon Pelsser and Jan-Willem Wijckmans

The design of European supervision of pension funds



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Postbus 90153, 5000 LE Tilburg, the Netherlands
info@netspar.nl

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PREFACE

Netspar stimulates debate and fundamental research in the field of pensions, aging and retirement. The aging of the population is front-page news, as many baby boomers are now moving into retirement. More generally, people live longer and in better health while at the same time families choose to have fewer children. Although the aging of the population often gets negative attention, with bleak pictures painted of the doubling of the ratio of the number of people aged 65 and older to the number of the working population during the next decades, it must, at the same time, be a boon to society that so many people are living longer and healthier lives. Can the falling number of working young afford to pay the pensions for a growing number of pensioners? Do people have to work a longer working week and postpone retirement? Or should the pensions be cut or the premiums paid by the working population be raised to afford social security for a growing group of pensioners? Should people be encouraged to take more responsibility for their own pension? What is the changing role of employers associations and trade unions in the organization of pensions? Can and are people prepared to undertake investment for their own pension, or are they happy to leave this to the pension funds? Who takes responsibility for the pension funds? How can a transparent and level playing field for pension funds and insurance companies be ensured? How should an acceptable trade-off be struck between social goals such as solidarity between young and old, or rich and poor, and individual freedom? But most important of all: how

can the benefits of living longer and healthier be harnessed for a happier and more prosperous society?

The Netspar Panel Papers aim to meet the demand for understanding the ever-expanding academic literature on the consequences of aging populations. They also aim to help give a better scientific underpinning of policy advice. They attempt to provide a survey of the latest and most relevant research, try to explain this in a non-technical manner and outline the implications for policy questions faced by Netspar's partners. Let there be no mistake. In many ways, formulating such a position paper is a tougher task than writing an academic paper or an op-ed piece. The authors have benefitted from the comments of the Editorial Board on various drafts and also from the discussions during the presentation of their paper at a Netspar Panel Meeting.

I hope the result helps reaching Netspar's aim to stimulate social innovation in addressing the challenges and opportunities raised by aging in an efficient and equitable manner and in an international setting.

Roel Beetsma
Chairman of the Netspar Editorial Board

Affiliations
Dirk Broeders: De Nederlandsche Bank
Niels Kortleve: PGGM
Antoon Pelsser: Maastricht University
Jan-Willem Wijckmans: PGGM

THE DESIGN OF EUROPEAN SUPERVISION OF PENSION FUNDS

1. Introduction

Within the European Union there is a large variety of old age income support systems. Many member states have a mixture of state provisions, occupational pensions and individual pension savings. However, the relative importance of and the interaction between these three pension pillars differs significantly from one country to another. In this paper we focus on the second pillar, that of employment-based pensions. The primary function of occupational pension schemes is to provide employees with a retirement income. There are many ways in which these occupational pensions can be organized. The key differences relate to the way such pensions are financed, whether the pension promise contains any guarantee, the way the guarantee is secured, and the level of risk sharing among stakeholders. The key purpose of this paper is to explore the optimal design of European supervision of occupational pension funds, given the wide variety of pension schemes. Supervision on these occupational pensions is carried out by national supervisory bodies, using regulatory frameworks that may differ by member state, as seen fit for each specific situation.

The European Commission has put forward the aspiration to further harmonize supervision on a European level. The Commission has issued a call for advice (Commission 2011) asking the European Insurance and Occupational Pensions Authority (EIOPA) on how to achieve this goal. Given the abovementioned

differences, harmonization will prove to be a challenge, and it may even impact the way pension schemes are designed. EIOPA has developed the concept of a 'holistic balance sheet approach' as the way to achieve as much harmonization as possible (EIOPA 2011). There are still many complexities that need to be addressed before harmonization can be achieved using the holistic balance sheet approach.

In addition to a single harmonized framework for all different occupational pension systems throughout the European Union, we propose a supervisory framework that is consistent in the methods and instruments used, but that is still tailored to the specific characteristics of each individual pension system. We propose a method of clustering pension schemes along three dimensions, and we discuss the various supervisory instruments that can be used for each cluster in order to achieve the goals of supervision in a consistent manner. A harmonized regulatory framework at a European level will be implemented through legislation in each member state. This raises the question of how much freedom is left for individual countries to shape the regulatory framework and how to tailor it to specific situations. This is the subject of further study.

The paper is organized as follows. In Chapter 2, we discuss the various differences in occupational pension systems. Six pension scheme clusters will be identified. We note that these six clusters can all be described along three axes: the pension benefit, the method of financing, and the level of risk sharing. This leads to a 'cube' of pension systems in which six of the eight corners can actually be used. This classification is used for further analysis of the way supervision can be structured.

In Chapter 3, we start by stating that the main objectives of supervision are related to assessing financial health, risk

management, disclosure, and governance. A prerequisite for good supervision is providing the right information in order for the supervisor to be able to assess these four areas. We therefore continue with an overview of instruments that are available to provide the supervisor with this information.

In Chapter 4, the concepts developed in the first chapters are combined by assigning to each pension cluster a group of usable and useful instruments. We argue that such a framework leads to instruments being consistently applied over different pension schemes in order to provide all the necessary supervisory information. Such a framework leads to convergence of pension supervision where possible. Finally, given the relevance of the subject and to provide the European Commission and EIOPA with an alternative use of the holistic balance sheet framework, we discuss this framework in greater depth. We recommend a holistic balance sheet approach as it can be a useful instrument for funded, collective schemes, including collective DC plans. But the approach also offers some challenges before it can be made readily available. One way to achieve this is to introduce the holistic balance sheet approach for designated pension funds and as an internal model. In that way practical experience can be gained and the challenges resolved, before the approach is widely introduced in pension supervision.

2. The various dimensions of pension systems

Pension systems can be characterized along the following three dimensions of a cube:

1. The pension benefit: guaranteed payouts versus non-guaranteed payouts
2. The method of financing: funding versus pay-as-you-go
3. The level of risk sharing: no risk sharing versus risk sharing among multiple stakeholders

The *first* dimension of the cube concerns the classification of benefits. In a system with guaranteed benefits, the pension benefits are fixed, but contributions can be adjusted to support adequate financing or to repair possible underfunding situations. The benefit level is determined by earnings (final pay or career average), the accrual rate, any possible offset from first pillar pensions, and the number of years of service. A defined benefit (DB) scheme without any predefined possibility of lowering the benefit but with the possibility of adjusting the contributions to ensure adequate funding is an example of the one extreme of this dimension. At the other extreme, in a pure defined contribution (DC) scheme, the contributions are fixed but the benefits are non-guaranteed, providing no security regarding the level of benefits. The pension benefits depend on total contributions paid and the return earned on the invested contributions. Intermediate, hybrid benefit structures are also possible. See Pugh and Yermo (2008) for an overview of hybrid benefit plans.

The *second* dimension refers to the method of financing. Under a pay-as-you-go system, pension benefits are financed from current contributions paid by the economically active generation. It is also possible that the benefits are paid directly

by the sponsor. This is known as a 'notional accounts' scheme or 'book reserves' scheme. In a funded system the contributions are invested in assets, which are used to finance future benefits.

Conceptually, the key difference between pay-as-you-go and funding pertains to the ownership over the claims on output. However, in both cases the economically active generation generates the output from which the elderly benefit as well. In the extreme case of a closed economy where pension savings were fully invested in government bonds, an intertemporal pay-as-you-go system would in fact be created, since government bonds in essence represent claims on future tax revenues.

The continuity of a pay-as-you-go system depends on its permanent political support. Such a system is relatively sensitive to demographic and macro-economic changes, whereas a funded system is exposed to inflation and investment risk.

The *third* dimension is the level of risk sharing across stakeholders. We identify the following stakeholders that are eligible as holders of risk:

- The sponsor;
- Current participants;
  - Active generations;
  - Passive generations (retirees and deferred members);
- Future participants.

Pension funds (or IORPs, Institution for Occupational Retirement Provision) with sponsor backing have an explicit risk sharing arrangement with the sponsor and/or its shareholders. Own fund IORPs, on the other hand, rely strongly on risk sharing across participants. We can distinguish between intergenerational risk sharing and intragenerational risk sharing. We will discuss both.

Pooling individual contracts in a pension scheme is to the benefit of all participants, as the law of large numbers states that idiosyncratic mortality risk can be lowered through diversification. Every individual person has no uncertainty about his of her remaining life expectancy after retirement. However, when individual pension contracts are pooled, this risk averages out, leading to intragenerational risk sharing. This is similar to the way a market portfolio of stocks diversifies the idiosyncratic risk of individual firms (see Brown and Orszag, 2006).

In contrast, aggregate mortality risks are additive, so that large populations do not give rise to lower risk. This compares to market risk in asset pricing theory. If, for example, the estimated general improvement in longevity of an entire population is underestimated, the entire portfolio is affected. An example of aggregate mortality risk would be a medical breakthrough that significantly reduces average mortality in the entire population. However, this uncertainty can be shared across generations, as not all generations will experience the same shocks. The advantages of intergenerational risk sharing are described in Lindbeck and Persson (2003), Cui, de Jong and Ponds (2009), Gollier (2009), and Westerhout (2011). Apart from risk sharing, human behavior also plays a role. In respect of pension saving, people often do not act rationally owing to such factors as lack of self-control or inertia (Mitchell and Utkus, 2004).

Finally, we note that the sponsor of a pension scheme can take one of two different roles. The sponsor can be a stakeholder within the risk sharing if sponsor backing amounts to contractual increases in contribution. The sponsor can also act as an guarantor, if it is contractually decided that the pension scheme can ultimately rely on the sponsor to cover any shortfalls in the payment of agreed pension benefits. This distinction is important

because of the impact on pensions: in the first case, the actual level of pension benefits is uncertain, because the increase in contributions can still prove to be insufficient to pay out all benefits. In the second case, the actual level of pension benefits is certain.

Most pension systems can be identified on the basis of these three dimensions of a cube. The three dimensions lead to a total of eight distinctive classifications (the eight corners of the cube). Moreover, different systems may exist side by side. One system is not inherently 'better' than another. The OECD has issued the report "Pensions at a Glance 2011: retirement-income systems in OECD and G20 countries" (see OECD, 2011). This report provides a range of indicators for comparison of pension policies between OECD countries. We have used the results of this report to classify the various pension schemes in Europe.

The OECD report begins by making a distinction between three tiers, more commonly known as pension pillars:

1. The first pillar is mandatory and consists of a redistributive part.
2. The second pillar is also mandatory; it consists of a savings part.
3. The third pillar consists of voluntary provisions.

Retirement-income systems are diverse and often involve a number of different arrangements. The OECD provides the chart depicted in Figure 1.

In this paper, we are mainly interested in the second pillar. We will provide a further discussion of second pillar arrangements below.

Most European countries have second pillar provisions. The OECD identifies four distinctive schemes within this second pillar:

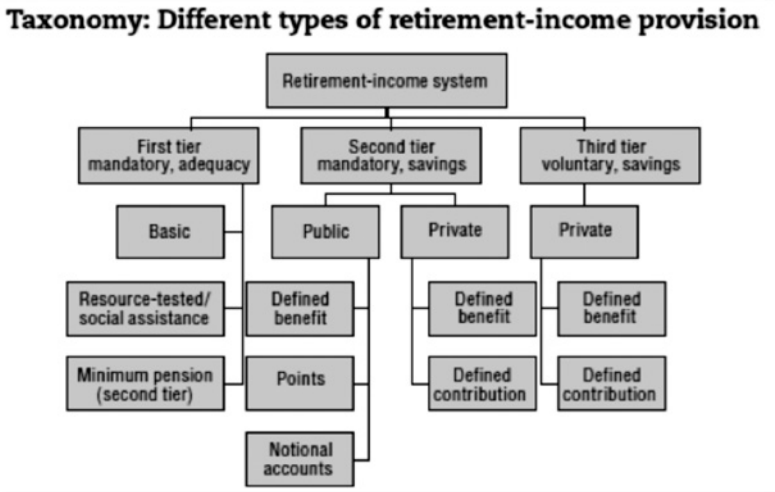

Figure 1: Types of retirement-income provision (OECD 2011)

- **Defined Benefit** (DB) schemes, where retirement income depends on the number of years of contribution paid and individual earnings. Private schemes are (quasi-) mandatory in three countries (Iceland, the Netherlands, and Switzerland). DB schemes are funded, and the risks are shared among multiple stakeholders.
- **Defined Contribution** (DC) schemes, where contributions flow into an individual account. The accumulation in contributions and investment returns is converted into a pension at retirement. DC schemes are funded, and no risks are shared among stakeholders.
- **Point Schemes** (PS), where workers earn points based on their earnings each year. At retirement, the sum of pension points is multiplied by a point value to determine the pension benefit level. These schemes resemble DB schemes in that the benefit depends on the number of years of contributions paid and the

individual earnings. However, there is also a DC characteristic in that the value of the points is not known in advance but determined at retirement age. Point schemes are generally pay-as-you-go schemes, with no risk sharing among stakeholders. In Germany, some point schemes take the form of a Contractual Trust Agreement (CTA), which makes them basically funded point schemes.

- **Notional Accounts** (NDC), where contributions are recorded in an individual account and a rate of return is applied to the balance. The accounts are "notional" in that the balance exists only on the books of the managing institution. At retirement, the accumulated notional capital is converted into a pension. NDC schemes can therefore be classified as pay-as-you-go systems, where the risk is shared with the sponsor.

We wish to add one more type of scheme to the OECD classification:

- **Collective DC** (CDC)**.** In this system the pension fund has the ambition (and sets its contribution and investment policy accordingly) of delivering inflation-linked benefits to its participants. To achieve this ambition at a reasonable price, all stakeholders agree to be exposed to investment risk (i.e. to invest part of the assets in equities). The investment risks are shared among the stakeholders (i.e. different generations in the fund and/or a sponsor). This risk sharing implies that there is no unconditional guarantee that the ambition regarding the benefits is realized. On the other hand, the risk sharing does imply that each participant faces lower risk compared to individual DC schemes.

Structure of retirement-income provision

	Public			Public	Private
	Resource-tested	Basic	Minimum	Type	Type
OECD countries					
Australia	✓				DC
Austria				DB	
Belgium	✓		✓	DB	
Canada	✓	✓		DB	
Chile	✓		✓		DC
Czech Republic		✓	✓	DB	
Denmark	✓	✓			DC
Estonia		✓		Points	DC
Finland			✓	DB	
France			✓	DB + points	
Germany	✓			Points	
Greece			✓	DB	
Hungary				DB	DC
Iceland	✓	✓			DB
Ireland		✓			
Israel		✓			DC
Italy	✓			NDC	
Japan		✓		DB	
Korea	✓	✓		DB	
Luxembourg	✓	✓	✓	DB	
Mexico			✓		DC
Netherlands		✓			DB

Figure 2: Structure of retirement-income provision per country (OECD 2011)

Structure of retirement-income provision

	Public			Public	Private
	Resource-tested	Basic	Minimum	Type	Type
OECD countries *(cont.)*					
New Zealand		✓			
Norway			✓	NDC	DC
Poland			✓	NDC	DC
Portugal			✓	DB	
Slovak Republic			✓	Points	DC
Slovenia			✓	DB	
Spain			✓	DB	
Sweden			✓	NDC	DC
Switzerland	✓		✓	DB	DB
Turkey			✓	DB	
United Kingdom	✓	✓	✓	DB	
United States				DB	
Other major economies					
Argentina		✓		DB	
Brazil				DB	
China		✓		NDC/DC	
India				DB + DC	
Indonesia				DC	
Russian Federation		✓		NDC	DC
Saudi Arabia			✓	DB	
South Africa	✓				

Note: In Iceland and Switzerland, the governement sets contribution rates, minimum rates of return and the annuity rate at which the accumulation is converted into a pension for mandatory occupational plans. These schemes are therefore implicitly defined benefit.
DB = Defined benefit; DC = Defined contribution; NDC = Notional accounts.
Source: See "Country profiles" in Part III of this report.

The OECD report provides a table with an overview for different countries, reproduced here as Figure 2. In Box 1 we discuss the classification of Dutch pension schemes in more detail.

Box 1. The classification of pension schemes (Dutch case)

The classification of pension schemes along the three dimensions may not always be self- evident. For instance, the cataloguing of a typical Dutch pension scheme is ambiguous for several reasons. In 2011, 93.5% of active members participated in career average schemes. These are treated in the regulations as Defined Benefit schemes. There are, however, four reasons why the liabilities in these contracts are in actual fact not fully guaranteed:

1. Pension funds usually run a significant mismatch between assets and liabilities. This puts the liabilities at risk.
2. Solvency requirements for IORPs in the Netherlands are based on a one-year confidence level of 97.5%, which is significantly lower than the 99.5% confidence level in the Solvency II framework for insurance guarantees.
3. Should a pension fund encounter a funding deficit, it will get a lengthy recovery period during which the effective confidence level is even lower.
4. In case of severe financial stress, a pension fund can as an ultimate measure reduce accrued benefits to restore its financial position. The Dutch Pension Act obliges IORPs to identify this measure as an ultimate measure in their pension deal.

Currently, most IORPs in the Netherlands are ambiguous since members expect guarantees, whereas the pensions can actually be reduced in severe economic scenarios. In a recent

pension agreement between employers and employees at national level, two options were given for future pension deals:

1. The benefits will be fully conditional, where adjustment of benefits becomes a contractual steering instrument. This conditionality will be on asset returns and on longevity. This will be communicated properly to all stakeholders.
2. The accrued benefits will become less conditional. The solvency requirements will increase for the 'unconditional' benefits.

One could characterize the first option as 'say what you do' and the second as 'do what you say'. However, both options seek to align reasonable policyholder expectations and benefits delivered.

We now wish to provide a classification of pension schemes along the three dimensions we have outlined before. Table 1 shows the result of this classification. Where possible, we also provide examples of existing pension schemes within the specific classification.

As mentioned above, we have chosen to make an explicit distinction between guarantees and risk sharing. This distinction

Classification	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Guaranteed	Yes	Yes	Yes	Yes	No	No	No	No
Financing	F	P	F	P	F	F	P	P
Risk Sharing	Yes	Yes	No	No	Yes	No	Yes	No
Example	DB	NDC	Guar. DC	PS	CDC	DC		

Table 1: Classification of Pension Schemes, F = funded, P = pay-as-you-go.

effectively means that we recognize pension schemes with a guarantee but without risk sharing, even though a guarantee might be thought of as a form of risk sharing. The risk sharing in categories 1, 2, 5 and 7 is therefore of the same nature: the fact that different groups of participants are belong to the same pension scheme enables a longer waiting period before measures such as withholding indexation, increasing contributions, or lowering pensions need to be taken.

In the third column of Table 1, we have identified guaranteed (individual) DC schemes, in which some form of guarantee is still provided to the individual account. Usually, such a guarantee comes in the form of a minimum return (i.e. a 3% return guarantee or the guarantee that members at least get their contributions back, which basically is a 0% return guarantee) provided by the sponsor. A guaranteed DC scheme is just one example that could be placed within the third classification; point schemes with contractual trust agreements are another example.

In Table 1 we can see that our classification along three dimensions leads to two of the eight corners not being filled. One might argue that examples could be thought of, but not in the second pillar of the retirement-income system. A non-guaranteed, non-funded scheme without risk sharing, for example, could be argued to apply to an entrepreneur who plans to sell his business at retirement. There is no cash funding of the entrepreneur's pension, there is no guarantee since the level of his pension depends on the prevailing market price at the time of sale of the business, and there is no additional risk sharing with other stakeholders. A non-guaranteed, non-funded scheme with risk sharing could be thought of as a company scheme where the benefit at retirement age depends on the financial health of the company at that particular time. However, we will not consider

these two outcomes further as they are rather uncommon. The regular schemes on the six vertices are not determinative as it is also possible to identify schemes inside the cube. Not all variables on the axes are 'binary' variables for pension schemes. As an example, one might consider a hybrid scheme in which only a part of the benefit is guaranteed. Also, one could argue that CDC schemes technically do not have a guarantee because of the risk sharing involved. The benefit is not equally insecure and dependent on the eventual outcome of financial markets as is the case for individual DC schemes.

We recommend in this paper that supervision should be tailored to the type of pension scheme. Therefore, we will explore the appropriate type of supervision in more detail in the following chapters.

3. Supervisory instruments

3.1 The purpose of supervision and the provision of information

Once pension systems have been classified, the purpose of supervision and the necessary supervisory instruments can be identified. Kortleve et al. (2011) state that the key objective of pension fund supervision is '*to make sure that reasonable policyholders' expectations are being fulfilled by the pension fund*', and that the key focus of supervision therefore should be to check '*to what extent are the contribution policy, investment policy, sponsor commitments, and funding position of the pension fund in line with the benefits and risks communicated to all stakeholders in the pension fund?*'.

To meet this objective, the supervisory authority needs to assess four key areas of attention of the pension scheme and the pension institution. These areas of attention are financial health, risk management, disclosure, and governance. A prerequisite for good supervision is that the right information is provided and analyzed. This assessment may lead to different levels of corrective action.

The information can be gathered using different instruments. The scope of this chapter is to provide an overview of these instruments. In Chapter 4, we will match the usefulness of the various instruments to the different pension schemes that have been identified in Chapter 2. Before turning to these instruments, however, it is useful to address the question of what information in each of the four areas is essential for adequate supervision.

3.1.1 Financial health

The financial health of the pension institution depends on the promise made and on the nature of the pension benefit. It also

depends on the financial prospects of the pension fund over a certain time horizon. The central question regarding financial health can be stated as follows:

> *To what extent is the pension fund able to live up to the communicated benefits, both now and in the future?*

To answer this question, information is needed on the following:
- What promise has been made, and what is the nature of the pension benefits?
- To what extent are the available assets sufficient to provide for the accrued benefits?
- What is the nature of the assets, and what risks are attached to them?
- What assessment can be made regarding the continuous ability of the pension fund to pay out benefits in the future? This question is closely related to risk management.
- What additional resources are available for the pension fund in order to pay out future benefits?

Answering these questions should be sufficient to form a conclusion on the financial health of the pension fund. However, the answers may not always be trivial since they often depend upon assumptions regarding future uncertainties.

3.1.2 Risk management

The financial health is obviously not a static measure. It will change over time as the pension fund is exposed to risks. One of the key responsibilities of a pension fund therefore is overall risk management. Managing a pension scheme involves great uncertainties, and trustees need to have a clear and consistent

understanding of these risks. Risk management touches on the likelihood and impact of adverse developments on the pension fund, the awareness of the trustees, and the ability to mitigate or avoid these risks. Increasingly, risk management is acknowledged to be more than just monitoring. Instead, it requires a pro-active approach. The central question regarding risk management can be stated to be:

> *To what extent is the pension fund exposed to adverse developments, and are the available measures to mitigate risk sufficient and in line with the goals and level of risk aversion of the stakeholders?*

The questions that need to be answered, based on information provided by the pension fund, are:

- Is the risk monitoring process adequate to ensure that the trustees and other decision-makers are in control?
- Is the risk management process specifically tailored to the relevant horizon of the benefits and specific characteristics of the pension fund members?
- Are the security mechanisms of the pension fund properly assessed?
- Is the risk management process adequately based on models that cover all relevant aspects of the economic environment?
- Do the security mechanisms of the pension fund correspond with the overall strategic risk level, and are they adequately managed to provide for the promised or expected benefits?
- Are all risks accounted for and incorporated in the day-to-day processes of the pension fund?

3.1.3 Disclosure

Next to financial health and professional risk assessment, disclosure is also of key importance for the financial soundness of pension funds and the resilience of the pension system as a whole. Just like risk management, disclosure to stakeholders is becoming an increasingly important topic. Especially regarding pensions, awareness among the general public used to be low and confidence regarding the benefits high. Successive economic crises, however, have arguably affected both funded and unfunded schemes in their ability to meet the promised benefits. This has led to greater public awareness and correspondingly to the need for better communication. We therefore state the central question on disclosure as follows:

> *Are the nature and risks regarding the benefits disclosed clearly and on a timely basis to all stakeholders?*

Disclosure creates trust and facilitates well-informed decisions by all stakeholders. A high level of disclosure is needed where individuals have the possibility to change pension fund provider or where beneficiaries are substantially exposed to risks. When beneficiaries participate in a defined benefit plan, disclosure of information about the pension fund's assets and liabilities are necessary to assess the exposure to shortfall risk. In case of defined contribution, disclosure should encompass items such as expected benefits, default investment options, appropriate diversification, and fees. High standards of disclosure will encourage trustees and managers to build transparent, comprehensible, and responsible pension organizations and processes.

The following questions are at the heart of this topic:
- Does the pension fund communicate clearly about the nature of the benefits and the risks attached to them?
- Is the communication tailored to the specific stakeholder groups and suited to their level of understanding?

3.1.4 Governance

Finally, the supervisor needs to be able to assess the governance structure of the pension fund. The central question can be stated as follows:

> *Is the chosen form of governance fit for purpose and adequately structured?*

The governance structure of pension funds is one of the key factors that drive a fair redistribution of assets and liabilities across all stakeholders. A customary key characteristic of pension funds is that both employers and employees are represented in the board of trustees and in internal supervision bodies. Key in governance is that the pension fund is responsible for compliance with legal requirements, even if certain activities are outsourced. The board of trustees must have sufficient expertise and integrity, and internal controls should be adequate. The actual answer to the central question touches on two major areas:
- Are the decision-makers knowledgeable and capable of overseeing all relevant aspects for the management of the pension fund?
- Are all processes, whether or not outsourced, adequately structured to ensure that the pension fund can perform its specific task without unacceptable risk of failure and corresponding consequences?

In the remainder of this paper, we focus on financial health, risk management, and disclosure. Good governance principles seem to be less diverse for the different pension systems and to be widely accepted by the entire pension sector (EIOPA, 2011). This allows us to focus on the issues regarding prudential regulation in more depth.

3.2 Instruments available for provision of information

We have identified financial health, risk management, disclosure, and governance as the key areas to be assessed by the regulator. We now turn to the instruments available for gathering the necessary information. Essentially, these can be split into quantitative and qualitative instruments. Most of the available instruments are quantitative because of the relative simplicity of assigning a value or judgment to the information. These instruments range from straightforward minimum requirements to long-term continuity analyses and holistic balance sheet calculations. Qualitative instruments comprise, for example, qualitative assessment reports and checklists. Both quantitative and qualitative instruments are discussed below.

3.2.1 Quantitative instruments

The most widely used form of supervision in the financial industry involves capital requirements. These rule-based instruments are both effective and simple, as red flags can be placed and follow-up actions triggered without the need of additional judgment or interpretation. We discuss the following instruments: capital requirements, continuity analysis, stress testing, recovery plans, and the holistic balance sheet approach.

– *Capital requirements*
Capital requirements, resembling the Minimum Capital Requirement (MCR) and the Solvency Capital Requirement (SCR), are the best-known examples of minimum requirements. We will refer to these capital requirements as MCR and SCR because of the widespread use of these abbreviations. A breach of these requirements automatically triggers supervisory actions such as recovery plans. The calculation of SCR is often based on a short-term Value-at-Risk measure. Typically the capital requirement is defined as the amount of capital required in order to withstand one-year scenarios with a certain level of probability. There are three ways for calculating the SCR: the standardized method (including partial internal models), a full internal model, and the simplified method (see Siegelaer, 2005 or Broeders and Pröpper, 2010).
  - The standardized method calculates the capital requirement by applying a prescribed variance-covariance matrix to capital requirements for individual risk factors for the total balance sheet. These risk factors usually include at least interest rate risk, equity and real estate risk, currency risk, commodity risk, credit risk, and insurance risk (e.g. longevity risk). The capital required for each of these individual risk factors is determined by the impact on the pension fund's surplus of prescribed shocks in the risk factor. The integrated balance sheet approach is of particular importance for interest rate risk as this affects both assets and liabilities. The disadvantage of the standardized method is that it will never perfectly match the risk profile of a pension fund.
  - A full internal risk model allows the independent risk management function to determine the capital requirement much closer to the precise risk profile. The use of an internal

model is typically subject to prior approval by the supervisor. A pension fund must demonstrate that the model is truly and independently embedded in the organization, and that the technical specifications of the model are adequate. Elements of an internal model may still rely on parts of the standardized method, provided this choice is not motivated by regulatory arbitrage. Typically, an internal model must be stochastic in nature.

- A simplified, conservative method may be introduced for relatively small pension funds. This requires a risk-averse investment strategy and a simple 'business model'. In practice the simplified approach may often prove to be redundant as the advantages of the standardized model outweigh those of the simplified method.

– *Continuity analysis*
Aside from these short-term requirements, long-term minimum requirements can also be of use. With continuity analysis, it is possible to assess whether the pension fund will be able to reach or stay above a certain funding level when normal operating conditions prevail. Key to continuity analysis is that the impact of security mechanisms such as indexation policy and contribution policy can be fully taken into account. The use of continuity analysis adds value to capital requirements. A pension fund that is currently better funded than the capital requirement can fail the continuity analysis test if preset policies (i.e. indexation or profit sharing) are too lenient. Continuity analysis can be especially useful for assessment and development of recovery plans. Even for DC and pay-as-you-go plans, continuity analysis can prove useful for gaining insight into expected wealth at retirement. Continuity analysis

is strongly related to the common practice in the pension fund industry of Asset-Liability Management studies and has thus become increasingly important (De Jong and Pelsser, 2010; DNB, 2007).

– *Stress testing*
  Stress testing provides insight into the risks faced by the IORP when adverse financial developments suddenly affect capital. Stress tests can be carried out on a short horizon to gain insight into worst case investment scenarios. For risks that will never materialize on a short-term horizon, such as deflation, inflation, or longevity risk, long-term stress tests can prove of value. A stress test verifies to what extent the pension fund is continuously able to meet its liabilities despite a period of distress, taking into account offsetting measures. Such stress tests do not necessarily need to have the same status as a capital requirement. However, falling below a certain predefined minimum capital or funding ratio within the results of a stress test can provide insight into the risks of the pension fund because modeling difficulties are avoided. A raised flag arising from a stress test can at the very least trigger discussion between the fund and the supervisor regarding the pension scheme's policies. Furthermore, it can be used in assessing whether the communication to participants about the expected benefits is adequate. This is again equally true for DC and pay-as-you-go schemes.

– *Recovery plans*
  When a pension fund is underfunded, it becomes increasingly important to monitor the road to recovery and the effectiveness of measures taken. At the start, a recovery plan is an important

instrument for the supervisor for review and discussion of the recovery measures that the pension fund needs to take. Going further, the actual situation can be compared to the expected recovery path. Given the known risk profile of the pension fund, a supervisor could even develop internal trigger points that act as a first warning for escalation of the recovery plan.

– *Holistic balance sheet approach*
Capital requirements are typically applied to fully funded pension schemes. Across Europe, however, multiple approaches towards securing pension provisioning are in use. A holistic approach can be used to capture all these systems into a single holistic balance sheet by valuing *all* available security mechanisms in an explicit way (EIOPA, 2011). In the holistic approach not only available assets can be used to cover liabilities (and capital requirements). Other mechanisms that provide security may also be given a place on the pension fund's holistic balance sheet. Examples include sponsor guarantees, unconditional contribution increases, and a contractual reduction of benefits.
The holistic balance sheet shows the supervisor whether the IORP complies with overall requirements, using various security mechanisms. However, it is clear that sponsor-related mechanisms are difficult to value. An alternative approach could be to modify the holistic balance sheet, by first determining what value of the employer covenant is *required* to bring total assets in balance with total liabilities. Subsequently the IORP would have to demonstrate that the existing employer covenant is strong enough to cover the required level. This would only require a rough estimate of the strength of the

sponsor and of the sponsor's ability to provide the additional capital to bring the solvency position in compliance with SCR.

Quantitative requirements have the advantage of simplifying the supervision process, since most red flags are unambiguously based on objective data. However, a risk of using quantitative requirements only is that the reporting framework is too restrictive to adequately reflect the specific situation of a pension fund. Most supervisory regimes therefore complement the quantitative instruments with qualitative instruments. These could underpin the specific characteristics of the IORP, thus mitigating supervisory action.

3.2.2 Qualitative instruments

The specific situation of a pension fund may be further identified by using qualitative instruments. As mentioned, qualitative instruments may require more subjective judgment and interpretation than quantitative instruments. We identify the following qualitative instruments: supervisory assessment, self-assessment, document sharing, and disclosure requirements.

– *Supervisory assessment*
  Since it goes further than mechanically checking the financial health of an IORP, a standardized supervisory assessment is an effective way to overview a large number of pension funds and thus gain insight in the overall status of the entire sector. Supervisory assessment is also suitable to cover governance, communication, and risk management elements. Without further detail, it can be the first phase before giving rise to additional information or discussion.

– *Self-assessment*
  The most common principle-based instrument for supervisors is to ask IORPs to periodically submit a self-assessment for a specific area of management. An insightful example can be taken from the insurance sector, where insurers are periodically required to submit an Own Risk and Solvency Assessment (ORSA). Such assessment is 'free form': the insurer has to show that appropriate risk controls are in place, regularly updated, and an integral part of day-to-day business. A similar assessment for IORPs would be adequate in reporting about non-standard situations since the reporting method is left free.

– *Disclosure requirements*
  Finally, rules can be set regarding disclosure requirements. Communication to participants is increasingly being recognized as an important factor to retain broad support of the pension sector, especially since financial and demographic developments have put pressure on pension agreements. Rules based requirements might require all IORPs to periodically provide certain overviews to their participants, to provide more transparency in policy or policy adjustments, or to communicate about relevant developments in the sector. As an illustration, Dutch pension funds are required to provide their participants at least annually with an overview of their expected benefits at retirement. Also, specific communication requirements have been developed to provide information about the quality of the indexation policy.

4. European supervision depending on type of benefit

In the second chapter we outlined that pension schemes can be clustered along the lines of the pension benefit, the method of financing, and the level of risk sharing. The supervision of pensions should follow the benefit promised and should be tailored to the benefit structure. In Chapter 3 we discussed the instruments available for supervision of pension funds. We sketched that we see room for quantitative as well as qualitative tools that European supervisors can use. In this chapter we will discuss how the supervision of the different type of pension benefits can be tailored.

4.1 Mapping instruments to pension schemes

In Table 2 and Table 3 we have mapped the quantitative and qualitative instruments suggested in the previous chapters on the different types of pension benefits. Next to indicating whether a particular instrument is applicable for the type of pension benefits, we also give insight into how in our view the instrument should be used.

We start by discussing the considerations underlying Table 2:

- Minimum capital requirements are only useful for funded schemes. When assets fall below the minimum capital requirement (MCR), any non-financial risk such as operational or actuarial risk can lead to a breach of the provided guarantee. For unfunded schemes, using an MCR is less evident but could still be considered to cover operational risk.
- Solvency capital requirements have largely the same application as MCR. The SCR is intended to protect benefits from adverse financial shocks. Clearly, a non-funded scheme has no capital to protect it against financial shocks. An SCR provides

Scheme	DB	NDC	Guar DC	PS	CDC	DC
Guaranteed	Yes	Yes	Yes	Yes	No	No
Financing	F	P	F	P	F	F
Risk Sharing	Multi	Multi	No	No	Multi	No
MCR	Yes	No	Yes	No	Yes For operational risk	Yes For operational risk
SCR	Yes Including steering instruments	No	Yes	No	Optional to reduce volatility in pension payments	No
Continuity analysis	Yes On assets, contributions and (indexed) pensions	Yes On contributions and (indexed) pensions	Yes On assets and (indexed) pensions	Yes On contributions and (indexed) pensions	Yes On assets, contributions and (indexed) pensions	Yes On indexed pensions
Stress tests	Yes	Yes On risk sharing and contributions	Yes Especially impact on assets and guarantor	Yes Especially impact on contributions	Yes	Yes Especially on (indexed) pensions
Recovery plan	Yes	No	Yes	No	Yes	No
Holistic balance sheet	Yes	No	Yes	No	Yes	No

Table 2: Quantitative supervisory tools per type of pension scheme

Scheme	DB	NDC	Guar DC	PS	CDC	DC
Guaranteed	Yes	Yes	Yes	Yes	No	No
Financing	F	P	F	P	F	F
Risk Sharing	Multi	Multi	No	No	Multi	No
Supervisory assessment on governance	Yes Including all stakeholders	Yes Including all stakeholders	Yes Including all stakeholders	Yes	Yes Including all stakeholders	Yes Mainly operational
Supervisory assessment on risk management	Yes Especially on assets, contributions and pensions	Yes Especially on pensions	Yes Especially on assets and pensions	No	Yes Especially on assets, contributions and pensions	Yes Especially on consistency
Self-assessment (ORSA)	Yes	Yes	Yes	No	Yes	Yes Especially on life cycle investing
Disclosure requirements	Yes Especially on contributions and stakeholders	Yes Especially on contributions, uncertainty and stakeholders	Yes Especially on stakeholders	Yes Especially on benefits and uncertainty	Yes Especially on contributions, uncertainty and stakeholders	Yes Especially on benefits and uncertainty

Table 3: Qualitative supervisory tools per type of pension scheme

additional security with respect to the guaranteed level of pensions and is therefore a logical and useful instrument. For schemes without any guarantee, this additional protection is not vital to the scheme. However, it could be used as an extra buffer to reduce benefit volatility or to accommodate risk sharing across stakeholders.

- Continuity analysis and stress tests are useful for any kind of pension scheme, since it can provide insight into the expected level of pensions, regardless of the way the pension scheme is set up. Their optimal usage varies, however, depending on the nature of the scheme. For a funded scheme, the expected development of available assets can be monitored; for non-funded schemes, continuity analysis can provide more insight into the future development of the population and necessary contributions.
- For funded pension schemes, either a guarantee or multi-stakeholder risk-sharing arrangement should be present for a recovery plan to be of use, since these are the only situations that have a desired level to recover to. Individual DC accounts without any guarantee cannot have a recovery plan since there is no level to recover to. Recovery plans are not useful for pay-as-you-go schemes.
- The holistic balance sheet approach is mainly useful for funded schemes, with at least some form of guarantee or multi-stakeholder risk sharing. For pay-as-you-go schemes, it is theoretically possible to draw up a holistic balance sheet including the option value represented by the willingness and ability of future generations to keep paying. However, this exercise however purely academic and offers few interesting possibilities for supervisory purposes.

From Table 3 it can be concluded overall that, for each and every scheme, qualitative instruments have some use. The focus for each instrument, however, highly depends on the type of pension scheme. The only instrument that seems of hardly any use is an ORSA in case of a pure Point Scheme. Since there is no guarantee to protect, no funds to manage, and no risks to be shared, the ORSA would have little or no content to assess.

4.2 Use of a holistic balance sheet

Above we argued that the holistic balance sheet approach is mainly useful for funded schemes, with at least either some form of guarantee or multi-stakeholder risk sharing. We already discussed some advantages and challenges of the holistic balance sheet approach in 3.2.1. We will now analyze the concept in more depth.

4.2.1 Advantages of a holistic balance sheet

A holistic balance sheet has various advantages:

- Incorporation of *all* steering instruments in assessing the solvency of pension schemes
- Enhanced comparison between different pension schemes
- Increased discipline and professional risk management
- Improved transparency

Inclusion of the steering instruments in a holistic balance sheet allows the distinction between pension schemes and insurers to be accounted for. It does imply 'same risk, same capital', but, to the extent that the benefits differ depending on the steering instrument, this will be incorporated in the balance sheet. The incorporation of various steering instruments also makes it possible to compare the enormous range of pension schemes. For

example, supervisors and members can compare a DB scheme with 90% funding, a sponsor covenant, and a pension protection scheme with a DB scheme with 110% funding, limited sponsor backing, and no pension protection scheme.

The inclusion of contingent assets and liabilities will lead to increased discipline and transparency. To be able to include these steering instruments in the balance sheet, it is necessary that all steering instruments are properly defined in the pension contract and that policy guidelines that can be used for valuation are defined for every situation. This is often said to be a 'complete contract'. Completing the pension deal clearly helps to improve the discipline of running the pension fund professionally. It can also help to gain more insight into the actual added value of steering instruments that may be relied upon by a fund. A clear example of this is sponsor support. Having a written agreement of support to the fund in stressful times can lead the fund into a false sense of security and an overly risk asset allocation when, in reality, it is unlikely that the sponsor will be able to fulfill the required obligation. A valuation of sponsor support, taking into account such factors as the frequency and amount of expected payments in relation to the magnitude and strength of the sponsor, can in that case help the fund to realize that the level of security may be less than accounted for. Better risk management and a more appropriate strategy could be the advantages of a valuation, however difficult this may be in practice. As mentioned in Kortleve et al. (2011), the objective of supervision is to oversee the alignment between the expectations of stakeholders and the benefits delivered by the pension fund.

The key objective of pension fund supervision is to make sure that reasonable policyholders' expectations are being fulfilled by the pension fund.

Communication is an important factor in the surge for improved transparency. Clarity about the value of all the steering instruments and how these will impact stakeholders will help reaching that goal.

4.2.2 Challenges of a holistic balance sheet

Although a holistic balance sheet has many advantages, we also see challenges:

- The valuation of balance sheet items may prove to be complex:
  - For contingent assets and benefits it implies the use of option techniques[1].
  - Markets are incomplete[2], so there is not always a market-consistent price available, leading to mark-to-model as best proxy.
  - The pension deal can be incomplete or have discretionary elements.
  - The sponsor risk has to be assessed.
  - A decision has to be made as to how many years ahead the steering instruments must be included.
- As described in the 'Security in occupational pensions' report (Groupe Consultatif 2010), pension rules should not be vastly disproportionate for smaller pension funds. Application of the

1 See Grosen and Jørgensen (2002) for the valuation of contingent benefits.

2 Experience with the FTK in the Netherlands has learned that even with guaranteed benefits to be discounted against the term structure of interest rates, the calculation can already be difficult since there is no market for long-dated liabilities (of 30-50 years and over) and for (wage) indexed liabilities. Moreover, the market can be less relevant or reliable in periods of severe stress.

holistic balance sheet has potentially far-stretching proportionality issues. The complexity of setting up a holistic balance sheet may prove to be burdensome or even unfeasible for smaller pension funds.
- A holistic balance sheet can lead to the perception of pseudo-security. The calculation will ask for considerable judgment on the part of both pension fund and supervisor, leading to an accumulation of assumptions and therefore model and parameter uncertainties.
- The full valuation of all steering instruments would also require the pension deal to be complete, in other words making trustee decisions on contributions, pensions, indexation, etc. on an ex-ante rather than ex-post basis in order to have all cash flows that are needed to prepare a holistic balance sheet. It also requires explicit conditional ownership of buffers that may currently be undecided. This can be a process that takes considerable time befodre being resolved, possibly delaying the introduction date of a new framework. Moreover, depending on how strict the rules would be set when adjusting the steering rules, reducing the managerial freedom of trustees would imply that supervision intervenes in the liberty that trustees currently have within the scope of the IORP Directive.

4.2.3 Introducing the holistic balance sheet approach in supervision

Dutch academics and practitioners have conducted considerable research on how a holistic balance sheet might be prepared (see Nijman and Koijen, 2006; Kortleve and Ponds, 2006; Kocken, 2006; De Jong, 2008; and Kortleve and Stigter, 2008). This research confirms that the concept of a holistic balance sheet is theoretically sound. Further research is still needed before a possible

introduction, although implementation of the concept of a holistic balance sheet will in itself stimulate this type of in-depth research further. Academics and practitioners alike can make valuable contributions on different aspects of the holistic balance sheet approach, such as valuation and simulation techniques, thereby making simplified approaches readily available. An assessment should also be made if the supervisory costs for small and medium-sized pension funds were to be disproportionate relative to the value of the benefits if the holistic balance sheet needs to be calculated on a regular basis. In our view, this work and the challenges mentioned in the previous section need to be addressed further before the holistic balance sheet approach can be widely introduced as a supervisory tool.

Next to further research on the subject, we see three steps before wide introduction of the holistic balance sheet approach can be realized:

1. The first step is having the European Commission and EIOPA conduct impact assessments and quantitative impact studies, in order to gain more insight into the impact the method has for pension funds.
2. A second step is for several designated pension funds, covering the various types of pension schemes identified in this paper, to start working with the holistic balance sheet approach before introducing the method to all pension funds.
3. Next to these two steps, the method could first be introduced as an internal model. This may prove to be an effective way to further develop the holistic balance sheet approach and stimulate acceptance across the pension sector. This may be especially true if its application leads to lower capital require-

ments, given the explicit valuation of the additional security instruments that are currently left out.

Giving pension funds the option to use the holistic balance sheet will enable them to include all steering instruments, which may lead to lower capital requirements. The use of such balance sheet will enable improved risk management and better understanding of the steering instruments and their impact for all stakeholders. A holistic balance sheet can lead to better informed decision-making and supervision. However, it may be too complex and disproportionate for smaller pension funds until simplified approaches become available.

5. Conclusions

In this paper we have examined the design of the European supervision of pension funds. This paper is a companion paper to Kortleve et al. (2011).

We have classified pension schemes along three axes. The first axis involves the guarantee provided with respect to the benefit. The second axis involves the method of financing the scheme: are benefits funded through contributions or on a pay-as-you-go basis? Along the third axis, the level of risk sharing moves from individual schemes to risk sharing among multiple stakeholders. We have shown that a wide variety of schemes can be found throughout Europe, but that these schemes can all be classified along the lines of these three axes.

Furthermore, we have formulated four core questions that accompany the four main purpose areas covered by European supervision of pension schemes:

1. Financial health: to what extent is the pension fund able to live up to its communicated benefits, both now and in the future?
2. Risk management: to what extent is the pension fund exposed to adverse developments, and are the available risk-mitigating measures sufficient and in line with the goals and level of risk aversion of the stakeholders?
3. Disclosure: are the nature and risks regarding the benefits disclosed clearly and on a timely basis to all stakeholders?
4. Governance: is the chosen form of governance fit for purpose and adequately organized?

We have discussed a wide range of quantitative and qualitative instruments that can be used to provide this information. Based

on the classification of schemes and the available instruments to provide supervisory information, the main recommendation in this paper is that supervision should be tailored to the pension scheme under consideration. At the two extremes of the scale we have identified DB pension schemes with a "hard" guarantee and individual DC schemes. Here the supervision should focus heavily on the communication of the scheme to its participants. Are the participants fully aware of the risks they run and of the expected benefit in relation to their expectations? Are the participants currently saving enough to obtain a sufficient retirement benefits level?

These are obviously only the extreme cases. In fact, we have identified a continuum of "shades of grey", ranging between pure DB and pure DC schemes (see Tables 2 and 3 for a complete overview of all supervisory instruments per type of pension scheme). In this paper we have given recommendations as to how, for different schemes in the continuum, the supervision process should strike a balance between ensuring that promised benefits are paid out and ensuring that risks and benefits are clearly communicated to all stakeholders in the pension fund.

Our main conclusions on the different instruments are:

- MCR is not useful for pay-as-you-go schemes.
- SCR is only useful for funded pension schemes with a guarantee.
- Continuity analysis and stress tests are useful for all types of pension scheme. Their optimal usage varies, however, depending on the nature of the scheme.
- Recovery plans are not useful for pay-as-you-go schemes. For funded pension schemes, either a guarantee or multi-

stakeholder risk sharing arrangement should be present for a recovery plan to be of any use.
– The holistic balance sheet approach is mainly useful for funded schemes, with at least either some form of guarantee or multi-stakeholder risk sharing. For pay-as-you-go schemes, it is theoretically possible to draw up a holistic balance sheet that includes the option value represented by the willingness and ability of future generations to keep paying. However, this exercise seems purely academic and offers few interesting possibilities for supervisory purposes.

As to the final conclusion and the importance that is currently assigned to the subject within the Call for Advice put forward by the European Commission (Commission 2011), we have also discussed the best way to start introducing and developing the holistic balance sheet framework. Our recommendation is that, after further research and impact assessments and quantitative impact studies, a holistic balance sheet approach should be first introduced for designated pension funds, as an internal model. Since the preparation of a holistic balance sheet is a complex and time-consuming exercise, it would help the introduction of the holistic balance sheet approach if this would lead to better insight into the risk profile of the pension fund and thus to better risk management. Finally, it might be appealing for pension funds to have other security mechanisms explicitly acknowledged alongside capital buffers for the protection of benefits. This would stimulate the entire field to continue developing the necessary techniques and might stimulate quick acceptance.

Literature

Broeders, D.W.G.A. and M. Pröpper (2010), Risk based supervision of pension funds in the Netherlands. In *Pension Fund Risk Management, Financial and Actuarial Modelling*, Micocci, M., G.N. Gregoriou and G.B. Masala, eds., Chapman Hall.

Broeders, D.W.G.A. and A. Chen (2012), Pension benefit security: A comparison of solvency requirements, a pension guarantee fund and sponsor support. *Journal of Risk and Insurance*, forthcoming.

Brown, J.R., and P.R. Orszag (2006), The Political Economy of Government-Issued Longevity Bonds. *Journal of Risk and Insurance*, 73(4): 611–631.

Commission (2011), 'Call for Advice on the review of Directive 2003/41/EC'.

Cui, J., F. de Jong and E.H.M. Ponds, 2011, Intergenerational risk sharing within funded pension schemes. *Journal of Pension Economics and Finance*, 10: 1–29.

DNB (2007), Continuity analysis contributes to sustainable pensions in the longer term, *Quarterly Bulletin*, September, www.dnb.nl.

EIOPA (2011), Response to Call for Advice on the Review of Directive 2003/41/EC: second consultation, *https://eiopa.europa.eu/*.

Gollier, C., 2008, Intergenerational risk-sharing and risk-taking of a pension fund. *Journal of Public Economics*, 92: 1463–85.

Grosen, A. and P.L. Jørgensen (2002), Life insurance liabilities at market value: an analysis of insolvency risk, bonus policy, and regulatory intervention rules in a barrier option framework. *Journal of Risk and Insurance*, 69(1): 63–91.

Groupe Consultatif (2010), 'Security in occupational pensions' Report of working party, May 2010.

Jong, F. de, and A. Pelsser (2010), 'Herziening financieel toetsingskader', NEA paper nr. 33, Netspar (in Dutch), June 2010.

Kocken, Theo (2006), 'Curious Contracts'. Tutein Nolthenius, 's-Hertogenbosch.

Kortleve, C.E., W. Mulder and A. Pelsser (2011), 'European supervision of pension funds: scope, purpose and design', Design paper 4, Netspar, October 2011.

Kortleve, C.E. and E.H.M. Ponds (2006), 'Pension deals and value-based ALM'. In: *Fair Value and Pension Fund Management*, Niels Kortleve, Theo Nijman and Eduard Ponds (eds.), Elsevier.

Kortleve, C.E. and J. Stigter (2008), 'Stuurknoppen pensioenfondsen meenemen in Europees solvabiliteitstoezicht'. *De Actuaris*, July 2008 (in Dutch).

Lindbeck A. and M. Persson (2003), The Gains from Pension Reform. *Journal of Economic Literature*, 41(1): 77–112.

Mitchell, O. and S. Utkus (2004), Pension design and structure. Oxford University Press.

Nijman, T.E. and R.S.J. Koijen (2006), 'Valuation and risk management of inflation-sensitive pension rights'. In: *Fair Value and Pension Fund Management*, Niels Kortleve, Theo Nijman and Eduard Ponds (eds.), Elsevier.

OECD (2011), Pensions at a Glance 2011.

Pugh, C. J. and J. Yermo (2008), Funding regulations and risk sharing. *OECD Working Papers on Insurance and Private Pensions*, no. 17, OECD Publishing.

Siegelaer, G.C.M. (2005), The Dutch Financial Assessment Framework: a step forward in solvency regulation of pension funds and insurance companies. In *Solvency II & Risikomanagement*, ed. H. Perlet and H. Gündl, 595–617. Gabler Verlag.

Westerhout, E. (2011), Intergenerational risk sharing in time consistent funded pension schemes, *CPB Discussion Series*, no. 176.

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Netspar

The design of European supervision of pension funds

Within the European Union there is a large variety of old age income support systems. Many member states have a mixture of state provisions, employment-based pensions (also called occupational pensions), and individual pension savings. In this paper Dirk Broeders (DNB), Niels Kortleve (PGGM), Antoon Pelsser (UM) and Jan-Willem Wijckmans (PGGM) focus on the second pillar, that of employment-based pensions. In addition to a single harmonized framework for all different employment-based pension systems throughout the European Union, they propose a supervisory framework that is consistent in the methods and instruments used, but that is still tailored to the specific characteristics of each individual pension system.