The Impact of Regulation on the Asset Investment of Defined Benefit Pension Funds

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In fulfilment of the requirements for the degree of
Doctor of Philosophy

Trinity Term 2013

TO LEO – IN MEMORIAM

Abstract

Pension funds are important institutions providing retirement income in our ageing societies and influential investors on international capital markets. Investment is a core function at pension funds; the investment return is an important tool in providing adequate pension benefits at sustainable costs. Risk taking is a necessary ingredient in pension provision, which is shaped through the intersecting forces of theory, market and regulation.

This century's financial crises deeply unsettled the pension fund universe. When the benign environment of the 1990s ended, DB pension funds found themselves at the intersection of financial turmoil and tightening regulatory and accounting trends, which marked a caesura to investment and risk management strategies: Pension funds have started to de-risk.

This thesis investigates the impact of regulation on the asset investment of occupational defined benefit (DB) pension funds in selected OECD countries in an effort to understand both the reasons for changing patterns of investment and the reasons for persisting differences. I suggest that the traditional consensus of pension risk taking and sharing is broken. The tightening web of regulatory and accounting rules has impeded pension funds risk taking capacity. A re-design of pension risk sharing is a necessary ingredient for shaping the pension fund system of the 21st century. Furthermore, pension funds regulation should be better aligned with social policy goals to cope with the transformation of pension systems initiated by demographic, economic and societal change.

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List of Abbreviations and Acronyms:

aba	"Arbeitsgemeinschaft für betriebliche Altersversorgung" (The German Association of Pension Funds)
ABS	Asset-backed securities
ALM	Asset-Liability-Management
BaFin	"Bundesanstalt für Finanzdienstleistungsaufsicht" (The German Financial Supervisory Agency)
CAPM	Capital Asset Pricing Model
CDC	Collective Defined Contribution
CDO	Colleraterised Debt Obligations
CEIOPS	Committee of European Insurance and Occupational Pensions Supervision
DB	Defined Benefit
DC	Defined Contribution
DNB	"De Nederlandsche Bank" (The Dutch German Financial Supervisory Agency)
EC	European Commission
EIOPA	European Supervisory Authority Insurance and Occupational Pensions
EMH	Efficient Market Hypothesis
ERISA	Employee Retirement Income Security Act
EU	European Union
FRS	Financial Reporting Standards
FTK	Financial Assessment Framework
GAO	Government Accountability Office
GFC	Global Financial Crisis

GPS	Global Pension Statistics
IASB	International Accounting Standards Boards
IFRS	International Financial Reporting Standards
IMA	Investment Management Association
IORP	Institution for occupational retirement provision
HGB	“Handelsgesetzbuch” (German Commercial Law)
LDI	Liability Driven Investment
NAPF	National Association of Pension Funds
NEST	National Employment Savings Trust
OECD	Organisation for Economic Co-operation and Development
ONS	Office for National Statistics
PAYG	Pay-as-you-go
PBGC	Pension Benefit Guarantee Corporation
PPA	Pension Protection Act
PPF	Pension Protection Fund
PPP	Prudent Person Principle
SAA	Strategic Asset Allocation
TPR	The Pensions Regulator
VaR	Value at Risk

Acknowledgements

First and foremost, I would like to thank my supervisor Gordon L. Clark. He gave me the opportunity to embark on this journey, patiently supervised the often too slow progress, giving guidance without restricting the development of my thoughts and this work. In this respect, my thanks go to the University of Oxford which provided a splendid place to free the mind and provide intellectual stimulation. It did not relief me of my very personal intellectual conflict between the theoretical foundations underpinning economics and those grounding economic geography. While the freethinking School for Geography and the Environment clearly was my physical and intellectual home base during the time I spent in Oxford, my stint to the Saïd Business School provided on the one hand welcomed reassurance in form of the mathematically deducted crystal clear insights and rules governing classical economics and business theory but at the same time revealed its ambiguity with the 'messy' world surrounding us even more so as powerful financial crises were evolving.

I would like to thank Johann Goldbrunner, my former superior, mentor and colleague stretching a long time span at different financial institutions, who introduced me to the topic of my thesis and linked me to the project between risklab, a daughter company of the asset manager Allianz Global Investors, which he founded and presided at that time, and the OECD. The idea to this project had been jointly developed by us when we attended an OECD meeting in Bangkok in 2003. This project proved to be the starting point and corner store of my thesis. I would like to thank Juan Yermo and Fiona Stewart (OECD), Gerhard Scheuenstuhl and his colleagues at risklab for their insights, support and helpful comments on my work. Furthermore, I would like to thank Herbert Wunderlich, who was at that time a senior manager at Allianz Global Investors, who

kindly opened his network for me. Without his support, I had hardly ever got into contact with many of my interviewees. I would like to thank all my interview partners who kindly spared precious time for me. They provided me with invaluable insights into the world of pension fund investing, regulation and governance.

Every DPhil is a journey. My journey took me through the seemingly not ending pension fund crises of the last ('lost') decade. Work on this thesis started in 2006 and continued much longer than initially planned. The Allianz-Oxford Pensions Conference, a conference of international pension experts, proved an important source of information and discussion challenging common wisdoms and providing new insights The first Allianz-Oxford Pensions Conference 2007 was initially conceptualised as a forum to present the results of the OECD-risklab project and a 'thank you' to all interview partners who supported us. This was made possible by the support of Joachim Faber. In September 2012 we will hold the fifth event of this kind. My thanks to all discussion partners over the years from whose comments I benefited tremendously. I want to mention explicitly Divjesh Hindocha, Paul Thornton and Niels Kortleve. My special thanks go to Con Keating who provided critical and very helpful comments on my work.

My final thanks go to my family, Marc and Leo. Foremost, I would like to thank my husband for his unconditional faith, love and support. Sadly, he was not able to witness the end of this journey.

Chapter 1: Introduction

1.1. The purpose of this thesis

This thesis investigates the impact of regulation on the asset investment of occupational defined benefit pension funds in selected OECD countries in an effort to understand both the reasons for changing patterns of investments and the reasons for persisting differences. In doing so, we compare the Anglo-American world with the continental European experience in a historical perspective in the context of globalisation. More fundamentally, this thesis is about the changing understanding of pension investment risk and its implications for sponsors and beneficiaries of pension funds as well as for regulators and the broader public policy agenda.

We focus here on occupational defined benefit (DB) pension funds, which are pools of assets established by one or more employers to provide earning-related retirement benefits to members (Yermo, 2002). Investment and longevity risk are borne by the plan sponsor. We analyse only those parts of pension regulation, which we regard as investment-relevant: Direct investment regulations either in the form of quantitative or qualitative regulations, funding regulations and accounting rules as well as the relevant parts of the regulation of pension governance. The time period covered is mainly the first decade of the 21st century.

Pension funds are important institutions providing retirement income. They collect contributions, invest the money on global financial markets and finally pay-out pension benefits. These are long-term concerns what can be illustrated by the simple fact that an individual membership in a pension arrangement can already stretch over 60 and

more years[1]. Furthermore, pension funds are usually constructed on a going concern basis serving multiple generations of beneficiaries. Therefore, pension funds are traditionally conceptualised as long-term investors (Davis and Steil, 2001; Blake 2003). As pension fund's assets are invested over long periods of time, the mechanism of compound interest unleashes its powerful potential: Seemingly small differences in annual investment returns increase exponentially into exerting a significant impact on the overall investment result of a pension fund, which will in turn affect either the level of contributions necessary to fund a pre-defined pension benefit (under a defined benefit or DB pension plan) or the level of future pension benefits funded by a pre-defined contribution (under a defined contribution or DC pension plan). Investment is thus a core function at pension funds (Davis, 2000). The net investment return represents an important tool in providing adequate pension benefits at sustainable costs[2]. As the investment decision is always a dual decision with the dimensions of return and risk[3], the investment decision-making process encompasses the basic dichotomy of efficiency and safety which characterises pension funds. Due to the uncertain nature of investment returns and investment risks, this investment process is inescapably embedded in risk.

The argument will be made that not only the observed investment practice differs in different countries but also that the attitudes to the basic dichotomy between investment risk and return changed over time. Distinct patterns of investment behaviour and risk management could traditionally be observed in different countries and they underwent

[1] Assuming a full occupational record of 40 years until retirement at age 65 and a further 20 years in retirement.

[2] See e.g. Melbourne Mercer Global Pension Index, October 2011, Available from: http://www.globalpensionindex.com/pdf/melbourne-mercer-global-pension-index-report-2011.pdf [accessed 26/06/2012]

[3] The positive correlation between return and risk was established by financial economic theory: 'The investor can expect more return if he assumes more risk'(Tobin 1958).

distinct changes. We acknowledge that this century's financial crises have thrown the traditional patterns of risk taking into a state of flux. But even so, national patterns of risk exposure are still clearly perceptible; the reasons for these patterns will be investigated. As all decision-making, also investment decision-making is contextualised (Clark and Strauss, 2007). Investment decision-making, which is usually the responsibility of trustees, is constrained by existing laws and regulations on national and international scale and further informed by the stakeholders' interests. Therefore, I focus on the impact of regulation[4] and governance on pension funds' investment and investment risk management. As these parameters have changed significantly over time, we will present a historical perspective explaining both persistence and change of investment decision-making.

The comparative perspective on pension fund systems reveals first of all a significant gap in the size of pension funds. The importance of pension funds differs enormously between the Anglo-American countries on the one hand and the continental European countries on the other hand. With 70 percent of pension assets in the OECD area owned by pension funds in the United States and the United Kingdom, pension fund capitalism remained largely an Anglo-American phenomenon. With the exception of countries like the Netherland and Switzerland, occupational pension funds were traditionally of minor importance in continental Europe, where the state pension and individual life insurance contracts predominantly performed the task of providing for old-age income. These patterns are changing: There is broad consensus in the literature that

[4] We start here with a broad understanding of regulation encompassing all mechanisms of social control as this enables us to subsume also accounting rules under this rather general term 'regulation'. In the further course of this thesis, especially in chapter 3, we will narrow this down to regulation in the understanding of a targeted rule set by governmentally appointed pension regulating authorities, dealing with accounting regimes separately (Baldwin and Cave, 1999).

the Anglo-American pension fund system is in crisis (Pemberton, 2006; Munnell, 2009; Mitchell, 2010). Occupational DB pension funds, traditionally the spine of retirement provision in the Anglo-American world, are in demise. The workplace-related DC pension fund systems emerging in its place is found to be inadequate in many ways, the low level of contributions being one of them (Mundell and Sunden, 2003; Lusardi, 2008). We will refer to this in more detail in chapter 2. A different development can be witnessed in continental Europe: Nourished by political initiatives by EU member states to foster private funded pension arrangement in order to substitute shrinking public pension benefits, pension funds in continental Europe have seen strong growth since the turn of the century. This rise of the 'New European Pension Fund System' went rather unnoticed by most of the pension literature (Clark, 2003a; Dixon, 2008).

We are witnessing the demise of the traditional DB pension funds in the Anglo-American world: Pension funds are being closed and ultimately wound up, sometimes via buy-in and buy-out arrangements with insurance companies. But nevertheless, these important financial institutions will be around for a long period of time[5], which is due to the long-term nature of pension provision. Thus, regulation of DB pension funds still matters. DB pension funds account for about half of OECD pension assets. The Anglo-American DB pension funds will remain the foremost important institutions providing old-age income for large cohorts in both the United States and the United Kingdom. Furthermore, it is vital for the 'New European Pension Fund System' to be adequately

[5] It is difficult to specify this 'long period of time' more precisely in quantitative terms as official data on the duration of pension liabilities is not available. The actuarial department of Mercer suggests an average duration of 20 years for UK pension schemes. As UK pension schemes are rather mature and have been leading the Anglo-American trend of closing down and winding up pension funds, this number can be regarded as the minimum level of the average duration of pension liabilities in the here analysed countries.

regulated in order to foster growth and high participation while ensuring both efficiency and security.

This thesis evolved over a much longer time span than originally planned. Work on this thesis started in 2006 in the aftermath of the first financial crisis and continued throughout the Global Financial Crisis (GFC) and the euro crisis. As such, I witnessed roller coasters of shock and relief at those responsible for managing defined-benefit pension funds. However, my expert interviews which inform this research were conducted between 2006 and spring 2008. Although partly updated by phone-led interviews, the information derived reflects mainly the experience of that time, i.e. the time between two major financial crises. While I fully acknowledge that the - at the time of this writing - still ongoing succession of financial crises has deeply shaken the world of DB pension funds, I believe that the information derived from these expert interviews still forms a valid reference point from which important lessons can be drawn with regard to assessing the changing nature of investment risk and investment risk management.

This century's financial crises deeply unsettled the pension fund universe. When the benign environment of the 1990s with roaring capital markets and a rather low-key regulatory attitude suddenly ended, DB pension funds found themselves at the intersection of financial turmoil and tightening regulatory and accounting trends, which marked a caesura in their investment and risk management strategies.

Pension funds experienced the first crisis which became known as the 'perfect pension storm' when between 2000 and 2003 simultaneously falling equity markets and interest rates eroded assets and sent liabilities soaring. Pension funds had mostly successfully restored their funding targets by 2007, when they were hit in 2008 by the

second major financial crisis, for which the terms ‘credit crunch crisis’ or increasingly the ‘Global Financial Crisis’ (GFC) are used. By 2010 the euro crisis had erupted further shaking stock and bond markets and extending the phase of expansive monetary policy. By end 2008, US DB pension funds had lost USD 1 trillion on investments representing nearly 30 percent of pension assets (Munnell et al., 2008). A similar picture evolves in the United Kingdom. Also in the Netherlands, where DB pension funds were stronger impacted by soaring technical provisions than by asset losses, the second crisis is perceived as far worse than the first one. The Dutch pension fund system is seen ‘in a state of some considerable crisis’ (van der Meij 2011). Only for German pension funds the 2007/2008 and beyond crisis can be seen as rather benign.

The crises have driven the search for a new mode of regulation. Already the ‘perfect pension storm’ was seen as exposing serious structural flaws in the regulatory system governing defined benefit (DB) pension plans in the United States (Warshawsky et al., 2005). Around the world, pension fund regulators started to critically examine their concepts and methods (OECD, 2005). Since then, pension funds in many countries experienced profound changes in their regulatory regimes. Three of the four here analysed countries implemented major pension reforms since the beginning of the 2000s and further pension reforms are in the political making. Although the single measures vary to a considerable degree, there are nevertheless certain common trends. This raises the question if pension fund regulation is globally converging and further leads on to inquiring into the driving powers behind this phenomenon.

This DPhil has three specific objectives:

- The first objective is to conceptualise pension fund systems thus contributing to the comparative theory of pension systems in a historical perspective.
- The second objective is to examine and explicate the regulation of pension fund systems thereby contributing to understanding the impact of regulation on pension fund investment. Here, we will also draw on capital market theory to develop a normative framework for an international assessment for regulatory policy.
- The third objective is to develop a deeper understanding of the investment-decision process by analysing pension fund governance in a contract-theoretical perspective.

This research conducts a cross-country comparison of the pension fund and pension regulation systems in four countries: Germany, Netherlands, United Kingdom and United States. The countries were chosen for significance and representation. Whereas the United States and the United Kingdom both represent large pension fund systems in the Anglo-American world, although with many differences and in different stages, Germany and the Netherlands represent widely differing pension systems within continental Europe. Germany epitomises here the traditional continental European approach to retirement income provision which is characterised by a large pay-as-you-go (PAYG) financed state pension system and a small voluntary private pension system. The Netherlands seemingly combine an Anglo-American pension fund system with a continental European style social paradigm and decision-making process. In this thesis,

we focus entirely on employer-sponsored DB pension funds. We apply in general the taxonomy of the OECD: The legally binding contract specifying the retirement terms is referred to as 'pension plan'; 'pension fund' describes the pool of assets assigned to finance the pension benefits. The pension entity is the special-purpose legal entity that owns and/or controls the pension fund (Yermo, 2002). The nationally used terminology might differ: In this respect, we cover 'pension schemes' as they are commonly referred to in the United Kingdom, 'pension plans' in the United States, and 'pensioenfonds' in the Netherlands. In the German context, which is characterised by a multiple of different legal entities, we cover 'Pensionskasse'[6] only.

The introductory chapter of the thesis is laid out on the following manner: In the next section I discuss the changing attitude towards investment risk as it manifests itself in the strategic asset allocation and explain its theoretical underpinning and the decision-making process through which it is derived. The third section of this chapter explains in broad terms the changing paradigm of pension regulation. We focus here on the investment-relevant parts pension regulation and theorise them more deeply in the context of financial regulation drawing specifically on the experiences in banking regulation. In the fourth section I lay out the methodological approach used in this thesis. The fifth section outlines the thesis providing its scope and structure. Finally, I close this chapter with a discussion of the limitation of the thesis.

[6] The characteristics of a further German pension entity, 'Pensionsfonds', are actually closer to the Anglo-American pension funds, but it was legally introduced only in 2001 and is therefore still small in terms of assets under management. For further detail see section 5.2.

1.2. Changing attitudes towards pension investment risk

Investment-decision making at pension funds is an important task as the investment results will determine the ultimate success of a pension fund. The question into the determinants of performance is thus important but unresolved (Koedijk and Slager, 2010). Studies show that the strategic asset allocation, i.e. the decision how to allot the total portfolio to different asset classes, accounts for 80 to 90 percent of the total investment returns (Brinson et al., 1986, 1991; Blake et al., 1999) which underlines its overriding importance.

The question remains how decision-makers at pension funds arrive at their choice of a specific strategic asset allocation. As we explain in more detail in chapter 3, financial economic theory whose domain it is to provide investors with investment concepts and strategies does unfortunately not serve them with unambiguous solutions (Orszag and Sand, 20006). A 'general theory of finance' remains a 'distant hope' (Scherer and Winston, 2012). Absent an exact scientific investment solution, research was increasingly undertaken into the value drivers of pension investment performance. A growing number of academics (Impavido, 2002 and 2010; Ambachtsheer et al., 2006; Clark and Urwin, 2008a, b, 2010 and 2011) underscore the importance of good governance for the performance of pension funds. Ambachtsheer (2006) and Clark and Urwin (2008a) also point out the importance of investment beliefs. First empirical tests found that a coherent set of investment beliefs positively impacts the success of a pension fund (Koedijk and Slager, 2010)[7]. Thus we can summarise that the decision on the strategic asset allocation is informed by the pension fund's investment beliefs, it is embedded in the pension fund'

[7] This list of factors for good performance results is far from exhaustive. E.g. the importance of scale was emphasized by Bicker (2006) in a study on the Dutch pension market and recently confirmed by Ambachtsheer (2009) in an international context.

governance structure and as such further contextualised by the legal, cultural and historic settings.

In this thesis we will not contribute to the search into the value drivers of pension performance but rather inquire into the factors relevant for pension fund investments – the constraints of the optimisation process. As we are especially interested in the question how much investment risk pension funds take, we need a methodology for measuring investment risk. We make the argument here that the strategic asset allocation reflects the attitude of the decision-makers at pension funds towards investment risk. Thus we will use the allocation of the total assets to the different asset classes as an indicator of investment risk.

Investment-decision making is a complex process: First, it needs to be focused on achieving the goal of the pension fund. Clearly defining the goal or the 'mission' (Ambachtsheer et al., 1998, Clark and Urwin, 2008a) of the pension fund is itself the result of clarifying and calibrating the interests of the stakeholders, including their diverging attitudes towards risk. In chapter 4 we will make the argument that the risk attitude of the decision-makers is grounded in the different governance structures of the pension fund which are itself embedded in each country's legal tradition. Second, pension investment is framed by legal and regulatory statutes; pension investment is regulated. The impact of regulation on the asset investment of pension funds is the central theme of this thesis and as such a recurrent topic throughout the chapters. We summarise the main regulatory approaches in the following section of this introduction. Third, as the investment decision is inevitably a decision simultaneously on expected investment returns and investment risks, a decision needs to be made on the amount and type of

investment risks a pension fund is willing to bear. A taxonomy of investment risk in the context of pension funds is provided in chapter 3. Clarifying the goal of the pension funds already provided the decision-makers with the strategic attitude towards risk, this needs to be detailed and operationalised for investment purposes. Many pension funds nowadays operate a specific risk budget. Different investment strategies developed by the investment industry derived from financial economic theory provide different risk-return profiles in allocating pension funds assets into asset classes and investment instruments. Fourth, the suitability of investment strategies for the individual pension fund must be judged by the decision-makers and will be informed by their investment beliefs – the lens through which they observe and analyse financial markets[8] (Koedijk and Slager, 2010). The world of investment is not static but highly dynamic. This holds true for the practical precipitations on financial markets as well as the theoretical concepts and available strategies. We will present here a brief overview of the development of asset allocation strategies and their theoretical underpinning.

In principle, pension funds can invest in the complete range of available asset classes. In some countries, the choice of asset classes and the maximum exposure to specified asset classes is restricted by the regulatory authorities. We will outline regulatory restrictions on pension funds' investments in general terms in the next section and in detail in chapter 3. The main asset classes pension funds invest in are equity and bonds, which typically account for 80 to 90 percent of a pension fund's balance sheet. The strategic asset allocation between equity and bonds represents thus the most fundamental decision of investment (Blake et al., 1999; Sutcliffe, 2005). The remaining

[8] Believing or not believing the Efficient Market Hypothesis according to which financial markets always and correctly price information represents one of the most fundamental investment beliefs. For further detail see section 3.2.3.

investments consist of cash and the ‘alternative asset classes’, a term used to encompass all of the more recently created investment vehicles and opportunities including hedge funds, private equity, commodities and also infrastructure (Inderst, 2009). In some countries real estate is treated as a separate and important asset class of its own.

As the investment optimisation exercise is mostly conducted in nominal terms, inflation risk, i.e. the risk of declining purchasing power due to rising prices, is not explicitly taken into account. From the perspective of the pension fund, inflation risk is relevant when the pension formula provides inflation-indexing of benefits. All countries have different rules and market practice. While inflation-indexing of benefits is not common in the United States, it is partly legally demanded in the United Kingdom and Germany, and stated ambition in the Netherlands. The perspective of the individual plan member differs: As economic utility theory since Modigliani assumes individuals to be concerned with lifetime consumption, inflation risk ranks high for pension plan members. Under common DB formulas pension accruals are linked to annual salary which generally exceeds price inflation. Thus, inflation risk becomes relevant for the individual with the start of retirement. The suitability of assets as inflation-risk hedge depends on their specific characteristics.

All asset classes are characterised by a specific risk-return profile. The underlying assumption is that people are risk averse; they invest only in riskier assets if they are compensated by higher expected returns. Thus, the higher the expected return of an asset class, the higher the expected risk. In financial economic theory, risk is measured as the volatility of the expected rate of return. Risk is thus a symmetric and relative concept

encompassing both the positive and negative variation from an expected outcome[9]. Bonds are considered a comparatively safe investment providing in its most basic form a regular stream of income from the normally fixed coupon; the invested capital is redeemed at the end of the fixed maturity. As all debt instruments, bonds are characterised by a contractual exchange of money between at least two parties and are therefore subject credit risk, i.e. the risk that contractual cash flows are not being honoured mostly due to issuer's insolvency. Secondly, bonds are subject to interest risk as bond prices are inversely related to volatile interest-rates on capital markets (Winston, 2012). Thus, nominal bond prices vary with both real interest rates and expected inflation; they fail to compensate the investor for inflation risk. As Bodie (1990) pointed out, only inflation-linked bonds, where the principal value is inflation-adjusted, offer a 'true hedge against inflation'. While the relevance of inflation-risk for pension plan members is undisputed, the relevance of inflation risk for pension investing depends on the specification of the pension plan. In case of nominal fixed benefits, also for the liability-immunising investor (for details please see section 3.4.), the accumulated benefit obligation is the appropriate reference point for pension investing and in case of a fully funded pension fund best immunised with long-term duration matching bonds. Only in case of inflation-indexed benefits inflation-linked bonds are the matching immunisation asset as they replicate the projected benefit obligation.

Equity investment on the other hand is regarded as a more risky investment. The equity investor provides capital to a company thus assuming a shared ownership of the company, the reward depending on the economic well-being of the company. Equity

[9] This concept of risk differs considerable from e.g. the risk concept employed by insurance companies as will be shown in chapter 3.

income consists of the dividend payment, which is decided annually by the company, and capital gains; the investment has unlimited maturity (unless the investor sells the stock or company bankrupts), unlimited risks and potential gains. Furthermore, like all assets denominated in nominal terms, equities are per se subject to inflation risk. The question if the return on stocks moves with the inflation rate so that common stocks are de-facto a hedge against inflation was widely discussed especially during the 1970s and 1980s (see e.g. Lintner, 1973)[10]. While most empirical studies of that time (e.g. Bodie, 1976, Nelson, 1976) gave evidence of the poor hedging capabilities of the stock market in the short term, more recent studies found evidence of a long-term stable relationship between stock and good prices (Anari and Kolari, 2001, Kim and Ryoo, 2009).

We theorise the strategic asset allocation between equity and bonds more deeply as the key decision on the degree of investment risk a pension fund decides to take.

Investment theory is the domain of financial economic theory. The undisputed starting point was the publication of on the seminal paper by Harry Markowitz 1952 'Portfolio Selection', which lay the foundation of the modern portfolio theory. This work was followed by further milestones such as the development of the Black-Scholes formula and the Capital-Asset-Pricing-Model (CAPM). Subsequently, a plenitude of quantitative investment and trading models and practical applications have been developed by academic and practitioners. Modern investment theory and practice is more often than not based on the Efficient Market Hypothesis (EMH), which basically states

[10] Classic economic theory regarded money as a 'veil' from which real values were independent. The claim that equity investors will be fully compensated for inflation (e.g. Siegel, 1984) is theoretically based on Fisher's (1930) hypothesis that the expected rate of return consists of a real return plus an expected rate of inflation and that the real return is invariant to the price level, practitioners and academics).

that markets are informationally efficient. In this theoretical world of perfect, frictionless capital markets, rational, risk-averse investors optimise their portfolios based on expected utility. Formulated in the 1960s independently by Samuelson and Fama, EMH became the dominating paradigm of the evolving theory of financial economic theory during the 1970s, and draw considerable controversy from different strings of argumentation from the 1980s onwards. We will give a more detailed overview of the theoretical concepts, their applications and critics in section 3.2.3. This knowledge is shared globally among investment professionals, which are all educated along the same theoretical lines. The Chartered Financial Analyst (CFA) Institute with over 100.000 members worldwide acts as the 'standard-setting institution for investment professionals worldwide'[11] in a self-organised way. Each year identical exams are being hold all over the world. In 2010 more than 200,000 candidates took the exams at 63 locations worldwide after a minimum of three-year course of studying in an effort to achieve the Chartered Financial Analyst[12]. The important point we want to make here is that there exists a standard of investment knowledge which is of global nature. Even though pension fund trustees might lack sufficient investment competence themselves as was suggested by reports (Myners, 2001) and academic research (Clark et al., 2006 and 2007) in the United Kingdom and more recently also in the Netherlands (van Dalen et al., 2010), pension funds have potential access to sophisticated investment knowhow either directly by employing investment professionals in-house or indirectly by seeking advice from pension investment consultants or professionals from the investment industry. In this research we will not further question the investment knowhow of the decision-makers at pension funds.

[11] Available from: https://www.cfainstitute.org/Pages/index.aspx [accessed 26/06/2012]

[12] Available at: http://www.cfainstitute.org/about/Documents/cfa_institute_factsheet.pdf , [accessed 26/06/2012]

Around the mid-twentieth century pension funds became important investors in equity[13]. Especially Anglo-American DB pension funds were large investors predominantly in their domestic equity markets. To a lesser extent this also holds true for Dutch pension funds. The picture for Germany is ambiguous and rather intransparent. Some single-company pension funds had equity exposure similar to the Dutch pension funds. The more recent data confirm the adage of German 'Pensionskasse' being predominantly bond investors. Until the turn of the millennium pension funds invested between 60 percent and 70 percent of their assets in equity, the former representing the typical portfolio of an US pension fund, the latter being the benchmark for a typical UK pension fund portfolio (Blake, 2003; McGill et al., 2010).

This investment behaviour has changed significantly: Overall, DB pension funds have started to de-risk. The reasons for these changes are manifold and mutually intertwined. We will explore them in detail in chapter 3 and 4. The two financial crises at the onset of the new millennium marked a caesura for the whole financial industry including pension funds and clearly served to reduce the risk appetite of the decision-makers at pension funds. Danielson and Shin (2009) present the theoretical framework explaining why market participants' risk appetite is positively correlated with risk. It still needs to be seen if the first revisiting of the modern portfolio theory which has just started will lead to a revision of the underlying theoretical concepts or rather a recalibration of the applied models (Fabozzi et al., 2010). Nevertheless, in the next section and further sustained throughout this thesis we will make the argument that changes in the regulatory sphere acted as underlying triggers of the new investment behaviour of pension funds.

[13] Please see Sutcliffe (2005) and Riley (2011) for historical evidence for UK pension funds, and Mc Gill et al. (2010) and Ponds and Riel (2007) regarding the investment practice at US and Dutch pension funds respectively.

The new regulatory dogma of risk-based regulation drawing on the twin pillars of a strong focus on funding levels and the fair value principle[14] for measuring assets and liabilities served as a powerful change driver in the practice of pension fund investing.

In more detail, we notice three main important trends in pensions fund investment over the last decade: First, pension funds expanded their investments beyond stocks and bonds into alternative asset classes thus further diversifying their portfolios in an effort to enhance returns and reduce volatility, i.e. risk. Reliable figures on the extent of this engagement are difficult to find. Fabozzi et al. (2010) estimate the allocation of pension funds to alternative asset classes in the largest pension fund markets at 16 percent at end-2008. As these alternatives are both rather new and rather non-transparent asset classes there is not yet much history or research into their respective performance[15]. They certainly dilute the rather clear-cut risk-return profile of the portfolio by asset classes as they may encompass very different investment strategies with widely diverging risk-return profiles as, e.g. in hedge funds. For further detail we refer to Anson (2006). Second, the relative importance of pension funds for their home stock market has declined with the increasing internationalisation of their investments. Especially US pension funds used to invest predominantly domestically (Yang, 2003). This home bias, i.e. investor's tendency to invest disproportionally more in domestic compared to international stocks compared to the portfolios generated by modern portfolio theory (Lewis 1999), has receded noticeably. The IMF suggests that the increasing

[14] In the context of pension funds the fair value principle was first applied by the accounting rule setters and spread subsequently into the regulatory sphere. Although not all pension regulating authorities demand measuring pension assets and liabilities at market values, its use is increasingly common as the sponsoring companies have to apply these rules when accounting for their pension funds.

[15] Ibbotson et al. (2011) found evidence of consistent high outperformance of hedge funds in a comprehensive academic study of the industry.

implementation of internationally diversified investment strategies is owned mainly to changing institutional incentives, such as deregulation, the wider use of global benchmarks and 'greater emphasis on the importance of risk-adjusted returns' (IMF, 2005). Especially corporate-sponsored US pension funds have turned into global investors (Greenwich, 2007). Third, what is most important in the context of this thesis, pension funds have reduced their strategic allocation towards equity and implemented risk-hedging strategies with bonds or via derivatives[16]. This trend is most pronounced in the United Kingdom, prior home to the 'cult of equity' (Sutcliffe, 2005). On average, UK pension funds invested an estimated 42 percent of their assets in equity in 2010 compared to over 60 percent in 2006[17]. While this general decline in the equity exposure of UK pension funds in balance sheet terms is largely due to valuation effects, pension funds also diversified their equity holdings internationally, net selling UK shares and buying – to a lesser extent – overseas shares increasingly via mutual funds.

This change in the observed investment patterns was theoretically underpinned by a changing paradigm of pension investing. Already the first financial crisis, the 'perfect pension storm' at the turn of the century with simultaneously falling equity prices and bond yields, served as a catalyst for challenging the wisdom of the conventional investment strategies and risk management techniques of pension funds(Ambachtsheer, 2005). Especially the traditional balanced mandate with a fixed portfolio mix of equities and bonds was criticised for exposing pension funds to considerable funding gaps. Globally, pension funds were criticised for taking too much investment risk. Since then,

[16] OECD, Pension Market in Focus, July 2010, Available at: http://www.oecd.org/dataoecd/46/46/45637367.pdf [accessed 26/06/2012]
[17] Clark, M. (2010). "Pension fund investment post-crisis", Pension Protection Fund. Available at: http://www.geog.ox.ac.uk/news/events/100923/session1-clarke.pdf, [accessed 26/06/2012]

pension funds' investment strategies have in general become more risk-focused. Investment strategies moved from statistic to dynamic and from balanced to core-satellite and to absolute return mandates. As pension funds portfolios became increasingly diversified over asset classes and regions, the core-satellite concept was developed, which split the portfolio into a number of different mandates which were awarded to separate asset managers with specialised know how in the respective market. As this greatly increased the number of asset managers employed and thus complicated the steering of the global portfolio, subsequently overlay mandates based on derivatives were developed which serve to change or fine-tune the portfolio without having to undergo the often messy process of actually changing the asset manager. The development of dynamic investment strategies which change the asset allocation in response to market movements introduced an element of timing and improved the risk control in case of market turmoil (Fabozzi et al., 2010). At the same time, the risk focus of pension funds' investment strategies has changed. In the traditional world, investment was mainly an exercise in optimising risk-adjusted returns conducted by the pension fund manager with often a rather loose view on liabilities. In the new world, liabilities became increasingly the starting point for the formulation of the investment strategy. Thus, the benchmark for measuring the success of pension investment changed: The traditional balanced mandate was constructed with the goal of outperforming capital markets as measured by market indices; in a falling market already an under proportionate loss was considered a success. Following the 2000-2003 crisis absolute-return strategies were constructed, which promise a fixed return over a risk-less benchmark while avoiding losses[18]. Absolute

[18] There is anecdotal evidence that not all these absolute (or total) return funds were able to fulfil this promise, which is often labelled a 'guarantee', during the global financial crisis.

return strategies were the first step of the investment industry in recognising an absolute return need of pension funds stemming from the necessity to honour the pension promise.

As a result of the earlier mentioned regulatory and accounting changes focussing on the funding status while measuring assets and liabilities at market prices, interest-rate risk is now perceived as the main risk pension funds face. As pension funds have to discount their liabilities with interest rates fluctuating on a daily basis rather than being fixed, the interest-rate volatility of their liabilities increased significantly impacting their funding status. The application of Asset-Liability-Management (ALM), which provides a strategic risk management system for long-term investors who pursue objectives and have to meet liabilities (Ziemba and Mulvey, 1998), became more widespread and professionalised (Sender, 2010). Furthermore, Liability-Driven-Investment (LDI) strategies captured pension funds' interest. Although its theoretical foundations date back to the 1950s (Fabozzi, 2007) practical applications were firstly offered by investment banks in the United Kingdom in the early 2000. Its spread in the European countries was uneven hinging mostly on the regulatory framework. LDI strategies arrived in the United States about 2006 where they seem to have spread rapidly among smaller pension funds at first. LDI is a 'strategic framework for mapping and managing liabilities' (Ellison and Jolly, 2008). The primary goal of LDI approaches is to manage interest rate risk. LDI strategies implement investment portfolios which aim at matching the characteristics and behaviour of the liabilities thus eliminating or at least reducing interest rate risk. Under an LDI strategy, the individual liabilities of the pension fund become the benchmark for the asset management. The portfolio is split into a liability-hedging portfolio aimed at matching the liability and a performance-seeking portfolio seeking optimal risk-adjusted performance (Martinelli, 2006). Apart from their genuine costs, the implementation of

LDI strategies was further hold back by the underfunding situation of many pension funds in recent years as they require the sponsor to fill the gap prior to the implementation of the LDI strategy as well as the long period of very low interest rates which made LDI strategies even more expensive. That LDI strategies are implemented not withstanding these disadvantages shows the great pressure on pension funds to balance their balance sheets.

We can sum up by restating that pension funds' investments changed significantly since the turn of the millennium. Especially company-sponsored DB pension funds take less investment risk than they used to thereby simultaneously reducing their return potential.

1.3. Changing paradigm of pension regulation

The regulatory environment is a key determinant for pension fund management (Fabozzi et al., 2005). The growth of pension funds in both size and importance was paralleled by a similar transition of their supervisory systems developing in scope and size from ensuring mainly tax and labour law compliance into complex risk management supervision (Brunner et al., 2008).

Comprehensive pension fund regulation was introduced from the1970s onwards. The United States introduces the Employee Retirement Income Security Act (ERISA) in 1974, the same year as Germany passed the Occupational Old Age Protection Act. In the United Kingdom the Pension Reform Act was introduced only in 1995. Prior, pension fund regulation was usually conducted in a rather piecemeal approach with different pension fund relevant regulations scattered over different laws. Often, pension fund regulation started as a side activity in the respective Treasury Departments. As the

provision of occupational pension is subsidised, the state is seen to have a legitimate interest in overseeing the process of pension provision to make sure that public money is employed in an efficient way. Rules preventing the misuse of pension funds as tax shelter by defining overfunding limits and restricting maximum contributions are examples of tax-focused regulation. Member protection was initially implicitly embedded in fiduciary duty and labour and social laws and became only later an explicit key focus of pension regulation. In both the United States and the United Kingdom, the legislative process towards comprehensive pension regulation started after major corporate insolvencies, which resulted in the loss of accrued pension rights for many workers[19]. Some countries introduced pension guarantee arrangements to safeguard the pension promise, which then necessitated further regulation to counterbalance the inherent moral hazard problem (for further detail see section 3.3.3). Furthermore, funding rules and measures to strengthen the legal claimant position of pension fund beneficiaries have been introduced to different extent in various countries.

There is broad consent among practitioners and academics that pension fund regulation has increased strongly as was shown by expert surveys. We are aware of the general risk of perception biases in surveys (Useem, 1995) but where objective data are missing expert surveys are frequently used as a reliable source of information (Fontana

[19] The phenomenon that crisis drives regulation is rather familiar to pension fund regulation. Both in the United States (ERISA, 1974) and in the United Kingdom (Pension Reform Act, 1995), corporate insolvencies involving the failure of the sponsored pension funds set into motion the passing of the first comprehensive pension legislation. In the United States, the bankruptcy of the auto company Studebaker and the termination of its pension fund in 1963 which resulted in substantial losses of pension benefits for active workers aged under 60 years is often cited as marking a turning point in public opinion paving the way for the respective legislation process (Jefferson, 1993). Still, it took over ten years until ERISA was finally passed in 1974. In the United Kingdom, Maxwell's depletion of assets of the pension fund of the Mirror Group served the same purpose (Clark, 1993).

and Frey, 2000; Castles and Mair, 1984). The results of a large survey of over 1,260 US experts conducted in 2008 were in this respect mirrored by a smaller panel of 120 experts in Germany: 80 percent of German respondents classified pension fund regulation as too complex (Burger et al., 2011). About 40 percent of pension fund sponsors in the United States cited inflexible regulation as a reason to close or freeze their pension plans (Clark and Monk, 2008). Nugée and Persaud (2006) base their argument of the 'ever-growing financial regulation' on the numbers of regulators and supervisors and the cost of maintaining them in both the United States and the United Kingdom[20]. In the United States, pension funds are today one of the most heavily regulated areas in business in American society (McGill et al., 2010). The same holds true for most other countries as well. But we observe that parallel to the ever tighter web of regulation (Monk, 2008) defined benefit pension funds repeatedly plunged into large funding deficits. These funding gaps, which received unusual attention from the broader economic and political media, are often perceived as epitomising the crisis of DB pension funds.

Since the onset of the financial turmoil at the turn of the century, crisis has been driving the search for a new mode of regulation Already in the aftermath of the 'perfect pension storm', which was seen as exposing serious structural flaws in the regulatory system governing defined benefit (DB) pension plans in the United States (Warshawsky et al., 2005), pension fund regulators around the world started to critically examine their concepts and methods (OECD, 2005). Since then, pension funds in many countries experienced profound changes in their regulatory regimes. Three of the four here

[20] For instance, the budget of The Pensions Regulator increased from GBP 28m in 2005/2006 to GBP 44.5m in 2012/2013 while the number of open DB schemes decreased (The Pensions Regulator, Annual Reports, http://www.thepensionsregulator.gov.uk/about-us/annual-reports-accounts-and-plans.aspx, [accessed 29/04/2013].

analysed countries implemented major pension reforms since the beginning of the 2000s, generally tightening the rules. Although the single measures vary to a considerable degree, there are nevertheless certain common trends. This raises the question if pension fund regulation is globally converging and further leads on to inquiring into the driving powers behind this phenomenon.

The regulatory response to the Global Financial Crisis was quite diverse. While the regulators in the Netherlands and the United States provided temporary relief to pension funds and their strained sponsors, the German regulator stepped up its monitoring activities, while the UK regulator choose to officially ignore the issue[21]. The search for regulatory consequences from the crisis regarding pension funds is ongoing. Policymakers focused their regulatory capacities on the banking sector which was at the core of the crisis. The United States passed the Dodd-Frank Act, a massive piece of regulation that in the opinion of a prominent member of the banking industry 'leaves no doubt that financial markets will be fundamentally reshaped' (Ackermann, 2010). The European Union acted swiftly in establishing new regulatory agencies on the EU level for all financial sectors including occupational pension funds, as the 'experience of the financial crisis has exposed important failures in financial supervision'(EU, 2010). First suggestions on regulatory changes regarding pension funds have been formulated at the level of the OECD (Yermo and Severinson, 2010); more recently, the EU has started a review of both its general pension policy and its specific pension fund regulatory policy, which we will summarise in the later course of this thesis.

[21] Antolin and Stewart (2009) present an overview over the regulatory responses to the crisis.

The search for a new mode of regulation is further driven by the need to adjust to the anticipated globalisation of pension markets (Laboul and Yermo, 2006). Pension funds start to leave the geographical space of the nation-state. While labour and social law governing pension plan design is still deeply rooted in national traditions, the same investment concepts are embraced worldwide. The 'paradigm for pension investment' (Ambachtsheer, 2005) is formulated on a global scale. Also, the method of pension fund accounting has converged worldwide (Whittington, 2006). The global world of financial markets has arrived at the doorstep of pension funds and their regulators.

This section explores into the conception of pension fund regulation and how it changed over time. As pension fund regulation is vast, we focus here on its investment-relevant parts. We provide the details on a country-per-country basis in chapter 5. We focus on regulatory activities by dedicated agencies which are guided and supervised by their respective ministries[22]. The terms *regulation* and *supervision* are used intertwiningly. In this section we will first discuss pension fund regulation in the light of globalisation and then outline the regulatory modes and principles.

1.3.1. Theorising pension fund regulation in the context of globalisation

Pension funds are financial intermediaries and important institutional investors. Consequently, pension fund regulation should be analysed through the lens of financial regulation in general. But at the same time pension funds are important welfare institutions providing old-age income. This view suggests that pension fund regulation should be analysed in a social policy context. This basic dichotomy characterises the

[22] Madero and Lumpkin (2007) discussed the question if integrated or specialised agencies are better suited to serve the regulatory purpose.

regulatory dilemma facing pension fund regulators. Globalisation adds a third dimension as company-sponsored pension funds are involved in the globalisation debate, directly as investors on global financial markets and indirectly as their sponsoring companies face the competitive market forces of globalisation. As we focus here on the impact of regulation on pension funds' investment we take the financial view on regulation analysing pension fund regulation against the background of the regulation of other financial sectors as banks and insurance companies.

Although pension funds are heavily regulated the rationale for pension fund regulation is not well researched in the academic literature on pension funds. In financial economic theory there is a rich literature on why we need regulation which focuses on the correction of market failures. We take here the theoretical framework developed by Goodhart et al. (1998) and apply it to DB pension funds. Goodhart cites three main reasons for regulating financial institution: (1) Containing systemic risk, (2) protection against monopolies and (3) consumer protection. The first argument is of overriding importance in banking regulation: It describes the phenomenon that due to high externalities the social costs of market failure exceed the private cost and the cost of extra regulation. 'Too big to fail' or 'too interconnected to fail' were the rationales behind the state interventions saving banks in the course of the credit crunch crisis. Argument (2) is of less relevance in regulating financial institutions even though the recent financial crisis induced oligopolistic structures in part of the banking industry which might lead to reconsider this issue in the future (Brunnermeier et al., 2009). Finally, consumer protection is considered necessary when the information costs are high and possible negative impacts far reaching.

There is broad agreement that unlike banks pension funds do not pose a systemic risk (Rocha et al., 1999). Nor is there the need to protect against monopolies as it is widespread in utilities. This holds true even though from the perspective of the employee the DB pension funds may hold a quasi-monopolistic position which is most obvious in case of mandatory membership. An employee may have the choice of joining the fund or not, but there is usually no choice between a range of DB pension funds offered by the same employer. But as pension funds are usually not in the pro-profit business they do not seek to maximise profits either and thus not exploit a monopolistic rent. The main rational for regulating pension funds is therefore consumer protection – analogue insurance companies. Following Goodhart et al. (1998) we distinguish between the case for prudential regulation and the case for conduct of business regulation. Prudential regulation, which arises from asymmetric information and principal-agent problems, represents the focus of today's pension fund regulation. It is usually formulated as the need 'to protect members' benefits'. The fiduciary role the pension fund assumes for its members combined with the presumed inability of members to judge all aspects of the financial contract and the long duration of the relationship all underpin the case for prudential regulation. Its focus is on securing the pension benefits to the members by preserving the financial viability of the pension fund. Although a main focus for regulating DC pension funds, the case for conduct of business regulation is less obvious for DB pension funds and has rather recently become an issue for regulators. Generally, 'conduct of business regulation focuses on how firms conduct business with their customers' (Goodhart et al., 2010). This includes information and advice and the more general conduct of business etc. The need for conduct of business regulation is very arguable in the case of the traditional employer-financed and employer-guaranteed DB

pension but increases with the spreading of both contributory and only employee-financed pensions. Also, the case is stronger for mandatory than for voluntary pensions. It is noticeable that the Netherlands established 2002 a separate authority, the Financial Market Authority, which is responsible for supervising financial market conduct thus safeguarding the interests also of pension plan members.

This theoretical rational is consistent with what can be found in the mission statements of the regulatory authorities in the analysed countries: Today's mantra of pension fund regulators is the protection of members' benefits. The regulatory authority in the Netherlands is the only one of the national pension fund regulators in the here analysed countries, which also follows a macro-prudential or systemic goal. In the Netherlands, the Pensions Act gives the De Nederlandsche Bank the task to focus 'on the standards in relation to the financial solidity of pension funds' and to contribute to the 'financial stability of the pension fund sector'[23]. Protection of members' benefits is in the Netherlands an indirect task for the supervisor as it informs the spirit of the Pensions Act and can be deducted from the goal to preserve the financial solidity of the pension funds. This is a rare example of macro-prudential regulation analogous to what is currently implemented in the realm of banking supervision; it represents up to our knowledge the only case of integrating abstract social policy goals which are often formulating in terms of 'strengthening occupational pension' into the concrete regulatory framework.

Regulation of pension funds is still conducted mainly on a national scale. We note that other entities have entered the world of standard-setting (Clark, 2011). The delegation of regulatory authority in the field of financial rule-making to the IASB is one

[23] Pension Act [version valid from 1 January 2007], Bulletin of Acts and Decrees 7 December 2006, 706.

of the most noteworthy examples of what Büthe and Mattli (2011) refer to as 'privatisation and internationalisation of governance'. Examples of the internationalisation of pension fund governance if not coercive regulation can be found in the interventions of the United Nations through the 'Principles of Responsible Investing' and the long-standing engagement of the OECD in the field of pension fund regulation (Ashcroft et al., 2011). Even though lacking legally binding power the international standard setting authority of the OECD unfolds its authorative power via a process of peer review thus shaping national agendas. Examples are the OECD Core Principles on Funding and Benefit Security, the OECD Guidelines on Good Pension Fund Governance and, together with the International Organisation of Pension Supervisors (IOPS), the OECD-IOPS Good Practices on Pension Funds' Risk Management Systems. We suggest that the OECD is further an important transmission belt in transporting and translating academic research and innovative thinking to the practical world of pension fund regulation.

The European Union (EU) introduced the first supranational regulation of pension funds in June 2003 with the IORP Directive on 'the activities and supervision of **I**nstitutions for **O**ccupational **R**etirement **P**rovision' (EU 2003) thus adding a further layer of pension fund regulation. This EU pension fund directive allowed cross-border provision of occupational pensions and also provided regulation for cross-border pension funds including funding rules. But otherwise, apart from formulating some rather broad regulatory principles, regulation remained mainly with the national regulatory agencies. This is intended to change. The EU established in 2003 as a first EU-wide regulatory activity CEIOPS, the Committee of European Insurance and Occupational Pensions Supervisors. As of 1 January 2011, CEIOPS was transformed into the European

Supervisory Authority Insurance and Occupational Pensions (EIOPA) as part of the new European System of Financial Supervision as the EU acted to 'strengthen the regulatory framework to reduce risk and severity of future financial crises' (EIOPA). Accordingly, EIOPA's mandate was expanded into an amalgam of macro- and micro-prudential tasks yet missing a clear hierarchy: 'EIOPA's core responsibilities are to support the stability of the financial system, transparency of markets and financial products as well as the protection of insurance policyholders, pension scheme members and beneficiaries'[24].

EIOPA's current main task is to provide advice on the revision of the EU pension fund directive which may prove pivotal in shaping the nature of the future EU system for funded workplace-related pension provision. The revision of the directive takes part parallel to conceptual work on the future European pension system by the EU Commission albeit the work strings do not always seem to be perfectly aligned. April 2011, EIOPA was invited by the EU Commission to provide its advice for the review of the IORP Directive ('Call for Advice'); both scope of advice and its guiding principles were provided by the Commission. The goal of the review is to 'complete the Single Market for occupational retirement provision' by facilitating cross-border activity and developing risk-based regulation[25]. In doing this, consistency across financial sectors should be maintained and regulatory arbitrage avoided, which is in accordance with the EU's goal of establishing 'level playing field' between competitors. Kortleve et al. (2011) review the EU regulatory process and offer recommendations for future EU regulation. The Commission's explicit reference to the new European framework for insurance

[24] Available at: https://eiopa.europa.eu/, [accessed 26/06/2012]
[25] European Commission (2011). 'Call for Advice from EIOPA for the review of the IORP Directive (IORP II)'. Available at: https://eiopa.europa.eu/publications/requests-for-advice/index.html,[accessed 21/06/2012]

regulation, Solvency II, proved highly contentious in the following consultation process[26]. In its final advice, EIOPA proposed the 'holistic balance sheet' as a means of 'developing a Europe-wide supervisory system for IORP's'[27]. The holistic balance sheet is constructed as framework to incorporate all different security mechanisms and steering instruments which exit within the EU second pillar. We present a detailed analysis of the characteristics on employer-sponsored pension funds in three EU countries in chapter 5. As was shown by Broeders et al. (2012) the implementation of this concept on a practical level would prove challenging. At the time being, all further conceptual work is subject to the results of a quantitative impact study which is – at the time of this writing – supposed to start in October 2012.

The main criticism being voiced relates to the equalisation of insurance companies and pension funds which the EC's reference to Solvency II might imply and the feared impact on the market for occupational pension funds if the funding buffers which Solvency II requests for insurance companies were to be enforced also on pension funds. The fears can be simplified summarised as imposing tremendous costs on pension funds thus acceleration the retreat of the employers out of pension provision and finally the end of voluntary occupational DB pension provision in the EU (Schwind, 2012). Regarding the first point, as we further elaborate in chapter 3.2.3 on the dissemination of modern risk management, there are fundamental differences between an insurance

[26] See the responses to the consultation process which was conducted in two stages in 2011. Available at: https://eiopa.europa.eu/consultations/consultation-papers/2011-closed-consultations/index.html,[accessed 26/06/2012]

[27] EIOPA (2012). 'EIOPA advice on the review of the IORP Directive 2003/41/EC'. Available at: https://eiopa.europa.eu/fileadmin/tx_dam/files/consultations/consultationpapers/CP06-11/EIOPA-BOS-12-015_EIOPA_s_Advice_to_the_European_Commission_on_the_review_of_the_IORP_Directive.pdf [accessed 26/06/2012]

company and the traditional employer-sponsored pension fund. The conceptualisation of pension funds underlying EU regulation has far reaching implications and also touches on the basic rational for EU-wide pension fund regulation. A main reason for EU regulation is to provide the above cited level-playing field, i.e. not to unfairly distort competition. But the traditional pension fund does not compete, it is not pro-profit. It is tied to its sponsoring company with the goal of providing pension benefits to its sponsor's workforce. We notice though that institutional change is blurring the traditional frontiers between the different financial sectors. We observe instances of pension funds entering into contractual arrangements with employees of not-sponsor companies on a pro-profit basis thus entering into competition with life insurance companies. This institutional change weakens the phalanx of the critics of transferring Solvency II to pension funds. The most important reason for EU-wide regulation of pension funds is based on economic rational resulting from the transformative powers of globalisation. The increasingly globalised companies require an increasingly mobile workforce which needs pension arrangements when moving internationally. Furthermore, these companies wish to pool all their separate national pension plans in one integrated pension fund for efficiency reasons. We fully recognise the validity of these arguments but rise the point that the embeddedness of pension funds in the national welfare systems may well act as anchoring force counteracting globalisation ambitions. We further exploit the topic of pension funds embeddedness in chapter 2. Even though convergence in pension fund regulation beyond basic principles might be 'ill-fitting across jurisdictions' (Yermo and Severinson, 2010), the EU takes the position that 'some common themes need to be addressed in a coordinated way' (EU, 2010).

Further criticism refers to the perceived misalignment between the EC's policy recommendations on the EU pension system and the revision of the IORP Directive. With the 2010 Green Paper 'towards adequate, sustainable and safe European pension systems' the EU opened the debate on EU pension provision in the light of the GFC focusing attention on the adequacy of regulatory scope given the structural changes in EU pension systems also opening the debate on the basic question of the risk-return trade-off. The European Commission raised questions on an adequate solvency regime for pension funds and on insolvency protection for pension fund members thus focussing on the safety of the pension delivery organisation. Also focus shifted on the efficiency of private pension schemes given their reliance on tax incentives asking the question if private pension schemes are able to deliver their pension promise. The 2012 White Paper presents a strategy for adequate, sustainable and safe pensions and provides recommendations on comprehensive pension reform which we will outline in more detail in chapter 2.4. In this context here, it is noteworthy that the White Paper stresses the importance of complimentary pension systems – both occupational and private- to help secure adequate pension provision (EU, 2012). It is exactly this macro-prudential goal of strengthening the occupational pension systems which is lacking in the IORP revision process. We make the argument here, that this macro-prudential goal is a necessary ingredient in this debate.

1.3.2. Regulatory modes and principles

When focussing on investment-relevant pension fund regulation, direct investment regulation is the most obvious starting point for research. But pension funds' investment strategies are further impacted more indirectly by funding rules as well as the approaches for measuring pension assets and liabilities as was tested in specially designed

ALM model, the results of which are included in the appendix. Furthermore, as we show in detail in chapter 4, regulations of pension funds' governance can have a significant impact on the investment risk appetite of the decision-makers at pension funds.

Chapter 5 provides a detailed description of the national regulations of pension funds' investments, the following sums up the most important points in a nutshell: All countries request pension fund investment to be 'prudent', the understanding of which is usually guided by pension regulators who are in most legislations entrusted with the interpretation of the pension laws, and finally decided in the courts[28]. This principle is also enshrined in the EU pension fund directive. Only Germany underpins the principle of prudence with quantitative investment restrictions.

The understanding of 'prudent investment' is subject to changes reflecting both the prevailing investment beliefs and investment goals (Ellison and Jolly, 2008). In general, pension funds are not allowed to leverage by taking out loans[29]. Also, investment into the sponsor's stocks is in most countries restricted as this would expose pension fund members to the double risk of losing both employment and pension benefits in case of the sponsor's insolvency. Furthermore, as pension funds are generally conceptualised as long-term investors, trading activities are usually considered imprudent behaviour for pension funds. Studies into the impact of quantitative rules versus the prudent person rule are limited. Davis finds evidence of the superiority of the prudent person rule in theory as in practical experience (Davis, 2000 and 2002, Davis and Hu, 2009). These results were

[28]We will explore into the understanding of prudent investment in detail in chapter 5. The following OECD definition of the prudent person rule may serve as a starting point: "… a fiduciary must discharge his or her duties with the care, skill, prudence and diligence that a prudent person acting in a like capacity would use in the conduct of an enterprise of like character and aims" (Galer 2002).

[29] Although pension funds do leverage by buying into leveraged products such as hedge funds.

confirmed in the joint study by the OECD and Risklab, which I co-authored (Blome et al., 2007). As I regard the results of this research as important, I will refer to this study throughout my thesis even though it is not included as a chapter but in the appendix.

In many if not most countries pension funds experienced profound changes in their regulatory regimes. Firstly and most obviously, all four countries alike are converging towards a closer focus on funding; solvency evolved as the undisputed major regulatory policy instrument for protecting members' benefits. Under all regulatory regimes pension funds are expected to fully cover their liabilities with their available assets. This represents a major policy change for the regulatory authorities in the Anglo-American countries, which were traditionally more lenient on funding than their counterparts on the continent (Laboul and Yermo, 2006). Second, the methodology for measuring risk changed. Instead of applying traditional valuation methodologies such as a historical cost approach or weighted averages of market prices for valuing assets and mostly fixed discount rates or discount rates which reflect the long-term return potential of the assets, pension funds are increasingly requested to apply marked rates to both assets and liabilities. The fair value principle developed by the international accounting bodies invaded the world of pension funds as well. It is argued here, that the worldwide triumphal procession of the fair value principle constitutes the single most significant change for managing and regulating pension funds. Criticised for causing the closure of DB pension funds (Klumpes and Whittington, 2003) and for distorting the asset allocation at DB pension funds (Amir, 2007), the research of Plantin, Sapra and Shin (2008) showed more fundamentally the inefficiencies of fair-value accounting whose negative impacts are greatest when applied to claims which are long-lived, illiquid and senior. These characteristics apply to key items on pension funds' balance sheets.

In general, principles and instruments that were developed for regulating banks have been increasingly applied to pension fund regulation as well. Within the financial sector, academic and policymakers' attention alike had always focused on banks due to their high systemic importance. Learning form the experiences of banking regulators is therefore a seemingly obvious exercise for pension fund regulators (Rocha et al., 1999). We describe in chapter 3 how the risk management methodologies and instruments disseminated as good practice from investment banks throughout the separate sectors of the financial industry up to the pension funds. This holds also true for some regulatory approaches. We will discuss funding and valuation rules and method and their implications on pension funds' investment in more detail in chapter 3 and 5. We focus here on the principle of risk-based regulation especially in its specification of a model-based approach employing Value-at-Risk (VaR). Introduced in the banking industry with Basel II this quantitative model-based approach was criticised early by a group of scholars around C. Goodhart at the London School of Economics for its pro-cyclicality (Danielson et al., 2001). Danielson (2003) and Danielson and Shin (2009) questioned more fundamentally the feasibility of risk-based regulation due to the endogenous nature of risk. Nevertheless, the principle of risk-based regulation disseminated into insurance regulation. The Solvency II Directive was adopted by Council of the European Union and Parliament in November 2009; the new regulatory regime is planned for implementation in 2014. More recently, risk-based regulation also spread into the realm of pension regulation. Most pension regulators describe their policy approach as 'risk-based' although understanding and design differs widely. Basel II-style model-base approaches employing VaR are operated only by the Netherlands (under the scope of this research). Quantitative funding rules with often prescribed methodologies are widespread though.

These funding rules have been also criticised for their pro-cyclicality (Weller and Baker, 2005) – this critic was recently addressed by the OECD (Yermo and Severinson, 2010). Recognising that 'the use of market prices for calculating pension assets and liabilities ... and the implementation of quantitative, risk-based funding requirements appear to have aggravated pro-cyclicality in pension fund investments during the crisis in some countries', Yermo and Severinson advocate the implementation of counter-cyclical funding rules and encourage regulatory authorities to avoid 'excessive reliance on current market values for purposes of determining contributions'. This OECD paper may mark the first step away from the current principles of pension fund regulation.

The regulatory changes resulted in a trend towards short-termism thus dialectically contradicting the conceptualisation of the pension fund as long-term investor. The regulatory fabric was woven more tightly; the pendulum swung towards safety. Regulators are increasingly taking the discontinuance view on pension funds. During the growth phases of occupational DB pension provision up to the 1970s or 1980s, regulation either focused on providing stable framework for proving pension benefits or treated pension funds with benign neglect focussing more on fiscal aspects. Especially Anglo-American pension funds were able to run high equity exposure thus capitalising on the equity premium and providing pension benefits at low cost for the plan sponsor. As the DB pension fund system as a whole has surpassed the growth stage and rather entered the stage of phase-out, the focus of regulation seems to have shifted on safeguarding a low-risk liquidation process.

1.4. Methodological approach

This research is based both on the methodology of close dialogue employed in economic geography and stochastic optimisation of investment strategies derived from financial economic theory. It thus combines qualitative and quantitative research methodologies. First, the methodology of close dialogue is employed to conceptualise the respective pension fund systems and pension regulation systems. Second, deliberately seeking the clash of theories, capital market theory is applied as the normative framework to evaluate regulation.

Close dialogue (Clark, 1998; Clark, 2007e) was used for interviewing experts in the financial services industry to construct an understanding of the investment-decision-making at pension funds in the context of regulation and accounting. I conducted semi-structured interviews in order to allow for cross-country comparability without unnecessarily restricting the potential richness of information. Close dialogue is chosen as the appropriate methodological approach when interviewing professionals, whose social status is equal or superior. I thus follow the current mainstream in economic geography as case-study research such as in-depth interviews once the exception has become a standard research method in economic geography (Tickell et al., 2007).

Extensive statistical analysis was not under consideration, as sufficiently detailed and internationally compatible statistics on pension funds in general, and pension fund investment in particular, do not exist. National statistics differ widely with regard to quality and quantity of data as well as definitions. The OECD started a 'Global Pension Statistics Project' in 2002, which has since then become the only available international statistics on pension funds. We will provide these data in form of a summarising table in

section 3.4 and further in form of charts on the asset allocation based on the OECD statistics in the country-specific sections in chapter 5. These data refer to total pension fund assets comprising both DB and DC plan assets. Even though we can often produce more specific figures from national sources, which we refer to where appropriate in a country-specific context, we decided to resort to OECD data for comparative purposes as they are the only available data which are internationally compatible and thus comparable. We use these data solely to illustrate the discussion on investment strategies. All these statistics offer very broad asset classed only and do neither reveal the reasons for this asset allocation nor the reasons for a change in the strategic asset allocation. The knowledge of the statistics as well the pension laws, regulatory directives and accounting rules serve as the external yardstick for evaluating and analysing the relevance and consistency of the information gained by close dialogue.

This DPhil draws on a joint research project between the OECD and Allianz Global Investors focussing on risk management at pension funds in selected OECD countries. This project provided a stylised assessment of the impact of pension regulation and accounting rules on investment and contribution strategies at DB pension funds in the context of an Asset Liability Management (ALM) model. A stochastic optimisation model was used to develop a best-practice pension investment strategy and to evaluate stylised regulation modules in their impact on the best-practice investment strategy. Thus, a first attempt was made to quantify the impact of specified regulatory measures and to compare different regulatory approaches with regard to their impact on the investment strategies at pension funds and thus on the costs of funding for DB pension for plan sponsors at a given degree of risk aversion.

The start of the project coincided with my enrolment in the DPhil programme at University of Oxford in January 2006 after having spent 20 years in the financial industry, the overwhelming part of it in commercial research. My last position was that of Director of Pension Research at Allianz Global Investors (AGI) in which role I had also started collaboration with the Private Pensions Department at the OECD. This joint AGI-OECD research project (further referred to as the 'project') thus provided me with the opportunity to gather unique information which forms the backbone of this thesis in the role of an equal member in a team of familiar high-professionals being either former colleagues or business partners. I was officially interlinked with both project parties. Project management on behalf of AGI was conducted by risklab Germany GmbH ('risklab'), a consulting and research company that develops and implements innovative solutions for asset management to support investment decisions. I absolved an internship at risklab between January 2006 and September 2006. Through this internship I got access to risklab's proprietary ALM system. My main responsibility was to consult risklab on the pension-related part in the project and to act in this respect as interface to the OECD. I also had a contract with the OECD to carry out consulting services as part of the project on pension fund regulation and risk management.

It was under this OECD consultancy that I started the series of expert interviews with high-ranking officials from pension funds, sponsors, asset managers, consultants, representatives from the respective national pension fund associations and their regulatory authorities. The interview partners were informed that the interview had a dual purpose in providing information to both the project and my thesis. I conducted semi-structured interviews focussing on the practice of investment and risk management and its context, i.e. individual plan design, governance, national regulation systems and

accounting rules. My questionnaire is included as appendix I. Appendices II and III provide a list of the interviewees and a sample interview note respectively. Support from AGI and Oxford University was vital in opening doors and making contacts. It is suggested that personal contacts were the most important reason that high-ranking executives took their precious time for these expert interviews. In some cases, the presumed opportunity to influence the agenda of pension fund regulation and to engage in the regulatory debate at OECD level seemed to have further increased respondents' willingness to engage in these interviews. Already 1998 Clark raised the question why finance-industry respondents are so willing to engage in close dialogue. In the context of this research pension fund managers clearly had an agenda as pension fund regulation by its very nature frames and impact their actions. This was rather expected. But regulation alone proved an insufficient explanation of the observed differences in the investment behaviour. German pension fund managers were the only ones who alleged regulation of having a strong impact on their investment decisions. This discovery set the course for 'digging deeper'. The asset allocation at the interviewed pension funds differed distinctly; asset allocation pattern on national levels were clearly visible and the differences were so large that the individual pension fund demographics could not explain them. Accounting rules were a further obvious cause for national differences as the new accounting regime, albeit converging on an international level, was introduced into national law at different stages of time. But accounting could thus only explain differences in the investment behaviour over the time span and should trigger the ultimate convergence of investment strategies – what at least until now has not happened. The question remained why in some countries pension fund managers took more investment risk than in other countries. I thus focussed closer on governance structures and their embeddedness in national legal rules

and traditions. The following work resulted in the article on governance which forms chapter 3 of this thesis.

The results of the AGI - OECD project were published as OECD Working Paper on Insurance and Private Pensions No. 8 in May 2007 ‘Pension Fund Regulation and Risk Management: Results from an ALM Optimisation Exercise’ and subsequently included in the ‘Private Pensions Series No. 8’ (OECD, 2007) . As I cannot claim to have contributed more than 50 percent, this paper is included as appendix rather than forming a chapter of this thesis.

After the conclusion of this project I continued my interviews with pension experts in the selected countries focusing on the practice of risk managements in the context of the changing regulatory and accounting rules. Still as part of my contract with the OECD, in September 2008 I handed in a second OECD Working Paper on Insurance and Private Pensions which was accepted by the OECD but for reasons unknown to me not immediately published. In summer 2009 the OECD asked for a quick review and update before final publication. As the second financial crisis happened to occur in between completion of the report and its intended publication, this turned out to be a rather challenging task. The details on regulatory rules could be rather easily updated as well as the included statistics. But it was not possible to rerun all expert interviews. Parallel, in accordance to OECD rules of procedure, this paper was sent to all OECD members, the supervising or regulating authorities of the OECD countries, for consent or comment. After tedious and difficult interventions mainly from the German regulatory authority the paper was finally released in March 2010 ‘Managing Investment Risks in

Defined Benefit Pension Funds' (Franzen, 2010). This paper informs chapter 3 and 5 of this thesis.

I conducted a total of 36 expert interviews with 37 interview partners which were further complemented by 3 background talks (for a split-up please see appendix 2). These expert interviews were conducted between 2006 and spring 2008. Two respondents in the United States were interviewed twice, in autumn 2006 and in spring 2008. On these two interviewing travels to the United States it was possible to experience the change in investment beliefs and risk attitude that took the United States rather late but sweepingly. The expert interviews were partly updated by phone-led interviews in 2010 prior to the publication of the OECD Working Paper on Insurance and Private Pensions No. 38. But the expressed views and opinions as cited in this paper are framed mainly by the experiences of the phases in between the two financial crises.

I am aware that my past experience as senior research professional in the asset management industry might have biased my attitude towards the interviewees, as well as my gender, age or citizenship. I was careful to take these potential biases into account when analysing the obtained information though I do not claim academic objectivity. I suppose most important was my previous career in the financial services industry in combination with my age by which I was received more as an insider in this industry. I am aware of the discussion about the impact of gender in corporate interviews with senior managers (McDowell, 1992) but following Schoenberger' response my comment is 'I am not sure precisely what difference it makes'(Schoenberger, 1992). The presence of a translator was not required. All expert interviews were conducted in English or German. The author is aware of an existing quality-bias as the expert interviews were in general

conducted with the large and most sophisticated pension funds. In this regard, the findings are not necessarily representative of the overall market but rather reflect the existing 'best-practice risk management'.

As assumed, most of the information obtained by interview is subject to confidentiality. Although I frequently quote received opinions, I do not identify respondents on a personal level but rather briefly describe the characteristics of the respective organisation they represent. I am also bound by confidentiality regarding risklab's proprietary Asset-Liability-Model. I am eligible to deeper insight into the model and to using the results for my DPhil, but not to document the proprietary core elements.

1.5. Outline

This thesis is arranged in four main parts and the appendix. The first part sets the scene by conceptualising pension funds in the different geographic regions analysed in this thesis and exploring the current debate in OECD countries. In doing so we survey the relevant literature on welfare theory, the comparative literature on pension funds and pension systems as well as the more nationally clustered research literature on the specific national dimensions of the pension challenge. It starts by outlining the dramatic process of global ageing which informs the pension debate in the OECD countries and beyond. The foreseen demographic changes imply that an increasing number of retirees, who are getting ever older, will be in need of old-age support while the number of working age people is mostly shrinking. Although this holds true in all OECD countries, the extent of the ageing process differs between the single countries. Germany and the United States form here the antipodes of changing demographics with Germany the most concerned and the United States the least. Furthermore, implications for the countries differ due to their

inherited pension systems. Drawing on welfare theory the chapter thus continues by describing the different concepts of pension provision, the development of pension systems and by classifying the different pension systems thereby crystallising the challenges for policy makers.

Once praised as the best pension system in the world, the UK pension system is in shatters. The occupational DB pension system which traditionally formed the backbone of pension provision to the middle class is in demise. The employers have opted out of the pension risk taking. A similar trend albeit already earlier was noticeable in the United States. Both countries are now focussed on coping with the consequences of nearly unfettered individualisation of pension risk. Especially the United States saw the development of a vivid academic literature on financial literacy in recent years. This triggered a rethinking of the level of involvement and responsibility of the State – especially in the United Kingdom - and the 'new paternalism' to direct individual decision-making in the presumed correct direction.

The continental European model of providing old-age income mostly via pay-as-you-go (PAYG) financed public pension systems will be rendered financially unsustainable by demographic change. Germany has started to essentially reform its pension system by reducing the future state pension and encouraging instead private pension contracts either via the employer or privately with a financial service provider. Correspondingly did the academic debate evolve around the funded versus PAYG debate. This political and academic battle is mostly over. The new focus is on how to fill the pension gap with quantitative studies researching the extent of the gap and the extent to which the new instruments designed to close this gap are taken up by the population.

Before moving on to chapter 3 what would be the logical expectation I would like to draw attention to the OECD publication 'Pension Fund Regulation and Risk Management: Results from an ALM Optimisation Exercise' included in the appendix as this was actually the first paper written and thus provides the reference point for the following research. Here, we applied financial economic theory as a normative framework to assess different modes of regulation. To be more precise, a specifically designed stochastic asset-liability model (ALM) was used as calibration tool to test the impact of different pension fund regulations and accounting rules which were presumed to be relevant for the investment decision on the resulting investment and contribution strategies in a stylised way. To our knowledge, this was the first time that such a cross-country or rather cross-system investigation has been conducted. In a nutshell, ALM is a key method in risk management. The essence of ALM is to align the investment strategy with the individual properties of the pension liability and the risk attitude of the plan sponsor within the given regulatory framework. As starting point, we constructed one synthetic pension liability which we deemed representative for all analysed countries. This liability was subsequently analysed according to different actuarial valuation methods. Second, we crudely precipitated the richness of national pension fund regulation into stylised bits which were digestible for the ALM. In spite of these brutal simplifications, a couple of interesting lessons were learnt: Firstly, we were able to show explicitly the impact of the valuation methodology on pension liabilities. Under the international accounting standard IFRS the pension liability both increases considerably and turns more volatile compared to the methods mostly applied by regulators thus significantly impacting contribution and investment strategies. While the impact of quantitative investment regulation was obvious and expected – by reducing the set of

available investment choices it leads to suboptimal investment decision and thus affects funding cost – the impact of regulation under the Prudent Person Principle (PPP) was not so obvious. Second, we were able to demonstrate in a quantitative way that regulatory funding rules impact the cost of funding the pension plan for the sponsor. Funding rules which either require full funding all the time or which are based on mark-to-market valuations with rather short recovery periods encourage low-risk and low-return strategies thus driving up the funding costs for the plan sponsor. Finally, the differences between the different valuation methods used by accounting and regulating bodies create a dilemma as the clarity of the optimisation goal is lost.

In chapter 3 we inquire into the forces that drive the practice of investment and risk management at defined benefit pension funds in the aftermath of the perfect pension storm. An earlier version of this part was published as OECD Working Papers on Insurance and Private Pensions No. 38, 'Managing Investment Risk in Defined Benefit Pension Funds' (Franzen, 2010). Referring to the literature on financial risk management in general and asset-liability modelling specifically, we describe the development of modern risk management in the financial industry in general and its development and practice at pension funds and their regulators specifically. An important insight gained here is that even before the credit crunch crisis has allegedly discredited the dominating dogma of financial economic theory, many pension fund managers were uneasy with the application of the risk management models derived based on this theory. Concepts and tools that were originally developed for one sector of the financial industry were rather transferred to other sectors without adapting them sufficiently to the specific risk profiles. This holds true especially for Value-at-Risk (VAR) an allegedly comprehensive risk measure developed in and for investment banking which is nowadays also commonly

used also in managing and regulating pension funds and insurance companies notwithstanding their different risk profile. We summarise that first there is no clear and common taxonomy of risk for pension funds. Second, nevertheless the understanding of what constitutes risk for a DB pension fund changed significantly over the last decade. This is clearly reflected in the changing regulatory framework and the accounting rules. The risk-taking capacity of company-sponsored DB pension funds has been eroded with significant detrimental effects on pension provision. The traditional conceptualisation of the pension fund as long-term investor does not hold true anymore. Chapter 3 explores the reasons by scrutinising the changing regulatory and accounting environment as well as the prevailing governance structures.

Chapter 4 takes this debate further by constructing a theoretical coherent model of the impact of governance on pension investment behaviour. We analyse pension fund governance through the lens of corporate finance by applying contract theory. We build here strongly on the work of Jensen and Meckling. We start by summarising the literature on pension fund governance, corporate governance and contract theory before we turn to a contract-theoretical analysis of pension fund governance where we construct first the agency relationship at pension funds before we map the risk attitude of the principals at DB pension funds, followed by the specification of property rights and finally the behavioural implications of property rights. The results confirm that governance matters for investment decision-making at pension funds. The delegated decision-making which is characteristic of pension funds informs the principal-agent problem. Property rights which specify the allocation of cost and rewards in any organisation will influence individual behaviour. In this respect this research is not an excursion into the new behavioural finance as started by Tversky and Kahnemann but rather an exercise in

pension law as it inquires property rights codified or practiced in the respective legal frameworks. Thus, the often claimed national patterns of risk attitude are theoretically underpinned and their legal and cultural embeddedness is stressed.

Chapter 5 offers a comprehensive survey the different employer-sponsored DB pension fund systems in Germany, Netherlands, United Kingdom and United States. We give first an overview of the pension market. This is followed by sections on the funding status, governance structure, plan design, regulation, investment strategies and risk management per country. This part thus contributes to the academic studies of comparative pension fund analysis

Finally chapter 6 summarises the arguments and restates the most important conclusions.

1.6. Limitations

In researching the impact of regulation on the asset investment of DB pension funds we limited our scope in two important ways: We did not analyse the behavioural aspects of the decision-making process at pension funds nor, what is more important, do we offer a template for best-practice pension fund investment or pension regulation.

With regard to the first limitation, we recognise that behavioural finance in the tradition of Kahnemann and Tversky offers important lessons and insights into financial decision-making even more so in the aftermath of the Global Financial Crisis, but our focus here is on how contractual aspects legally embedded shape behaviour, not on the psychological aspects. We did not research individual biases in decision-making rooted in behavioural finance. Furthermore, this thesis draws heavily on expert interviews with

managers at pension funds, which can be regarded as professional and sophisticated investors. The same characterisation applies to the interviewed consultants, asset managers or investment bankers. We never questioned the investment competence of the interview partners conceding that it most probably significantly exceeded our own knowledge. As we did not have the opportunity to interview separately different people involved in the investment decision-process, it was not possible to research the question how the decision evolved within the pension funds. In this respect we treat the pension fund as a 'black box'.

It has unfortunately not been possible to capture the opinions of the decision-makers after the second financial crisis. Insights in this respect are rather anecdotal drawing on casual talks at conferences. So while this thesis represents a journey through the rapidly changing pension landscape at turbulent times, it falls short of capturing the complete story. I leave for future research a detailed investigation into how the Global Financial Crisis has impacted the risk attitude at pension funds and their regulators.

The second limitation of this thesis is that it does not offer solutions. Mapping the pension conundrum in an international perspective we provide an understanding of the geography of pension funds in the context of regulation and accounting and beyond in a historical and jurisdictional perspective. We analyse flaws in current regulatory and accounting practice and we explain the reasons for the investment practice in the respective countries, but it is beyond the scope of this thesis to offer the blueprint for a best-practice solution to investment or regulation.

Notwithstanding the limitations described above, gaining a deeper understanding of the impact of regulation on pension fund systems is a vitally important step in

developing improved regulatory concepts thus contributing to the sustainability of the DB pension fund sector.

Chapter 2: Defined Benefit Pension Funds in Context

2.1. Introduction

Pension funds belong to the most influential investors in global financial markets (Clark, 2000; Davis and Steil, 2001, Boeri et al., 2006). Even after suffering significant investment losses in the wake of the Global Financial Crisis pension funds still constitute together with insurance companies and mutual funds one of the three largest groups of institutional investors in OECD's financial markets[30]. At the same time pension funds are important welfare institutions providing old-age income for many people. This dual character of being social institutions rooted in the welfare state and at the same time being financial institutions closely embedded in international finance is a common characteristic shared by all pension funds.

This has two important ramifications: First, we believe that pension funds must be analysed from both welfare and financial perspective. The welfare perspective sets the overriding goal of providing adequate pension benefits consistent with the prevailing social paradigm. The financial perspective is concerned with the efficiency of pension provision focussing on costs (contributions) and results (pension benefits), the investment process and risk management. As this thesis takes mainly the financial view on pension funds; this chapter thus intends to frame the issues. Second, albeit pension funds are

[30] OECD, Recent Trends in Institutional Investors Statistics, 2008, Available at: http://www.oecd.org/dataoecd/53/49/42143444.pdf, [accessed 26/06/2012]

important providers of retirement income – they are not the only one. Most people receive their retirement income from different sources, the state pension, life annuities or the DB pension benefits provided by pension funds, to name just some of them. All these different pension benefits are characterised by a unique risk-return-profile which can be adequately evaluated only in the context of the total retirement income. Thus, we have to conceptualise pension funds in the broader context of pension provision in general. Pension benefits are either provided by the state or by the private sector. The state and the market are thus two spheres, which are closely interrelated in the provision of retirement income. Changes in the sphere of private pension funds can have significant implications for the welfare of many people and are therefore an important political issue. Changes in the state pension sector are not without repercussions for private institutions providing pension benefits. In the pension arena, social, economic and demographic changes intertwine closely with the political debate. This chapter reviews the existing literature tracing the origins of the debate on pension provision in a historical perspective to provide a better understanding of the significance and conceptualisation of DB pension funds in the respective countries.

Already back in 1976 Peter Drucker forecasted the rise and importance of pension funds in the ageing society. Fuelled by the growth of financial markets pension funds had become powerful financial institutions in the late 20th century employing global finance for providing for retirement and supplying the transforming Anglo-American economies with the necessary financial capital. Increasingly the rise of pension funds

attracted the attention of academics and pension research clusters were started[31]. Having been hailed for their financial sophistication and the efficacy with which they 'produce' pensions for a long time, nowadays pension funds are mostly discussed in the context of crisis (Clark 2006b; Frijns 2010). Not only that pension funds faced a succession of major financial crises since the turn of the century repeatedly suffering significant investment losses, the fundamentals of pension fund systems seem to be shaken in parts of the world epitomized by the demise of the defined benefit (DB) occupational pension fund system in both the United States and the United Kingdom. Perhaps even more important is the loss of trust and confidence in the safety of the pension promised by these institutions for retirement which mirrors the shaken belief in the imperatives of financial markets in the wake of the two major financial crises which is noticeable throughout the Western societies (Frijns, 2010).

But pension funds constitute just one facet in the broader context of pension provision, albeit an important one. Overall, pension systems are in a state of flux; change is clearly on the agenda. Demographic, economic and social changes have manifested themselves in a transformation of the pension systems that we inherited from the post-war area. The Anglo-American approach to pension provision at the outgoing 20th century is characterised by a strong individualisation of pension risk. The employer-sponsored DB pension fund system, traditionally an important source of retirement income, is in demise. Both the United States and the United Kingdom are faced with the shift from DB to DC plans. Whereas under a DB pension plan employees enjoy a fixed pension promise with

[31] Examples are the Pension Research Council of the Wharton School of the University of Pennsylvania, the Centre for Retirement Research at Boston College, the Rotman International Centre for Pension Management at the University of Toronto, and Netspar, a network for research and education in the field of pensions, aging and retirement in the Netherlands.

the employer bearing investment and longevity risk, decision-making and risk bearing are individualised under a DC plan. Increasingly the lesson is learnt that DC pension plans are not the easy panacea to the pension challenge (Clark and Urwin, 2011). A growing literature addresses the shortcomings of DC plans focussing on the observed poor decision-making of individuals (Benartzi and Thaler, 2001 and 2007; Munnell and Sunden, 2003; Munnell, 2006; Munnell et al., 2009; Choi et al., 2005; Clark et al., 2008 and 2012, Lusardi et al. 2008).

Second, the geographic dynamics of pension fund capitalism are changing. 'Pension Fund Capitalism' (Clark, 2000) had remained largely an Anglo-American phenomenon, with the Netherlands, Switzerland and partly Scandinavia[32] being the exceptions in continental Europe. As yet unnoticed by many, continental European pension funds are set to grow (Clark, 2003a; Dixon, 2008). Demographic change manifested itself in pension reforms which rebalance pension provision from PAYG-financed state pensions to funded private pensions. In doing so, the continental European countries face significant challenges as well. These partly mirror the behavioural problems observed in the Anglo-American countries but extend into plan design and institutional structure.

Thus, significance and understanding of DB pension funds is changing. In this chapter we want to set the stage for a re-conceptualisation of DB pension funds within the changing pension landscape as this will have significant implications for the investment

[32] Institutional design and function of Scandinavian pension funds is distinctively different from the other countries cited above as in most Scandinavian countries the funded part of the pension system is characterised by a dual structure of National Pension Funds designed to pre-fund parts of the state pension and effectively mandatory occupational pension funds offering DC plans whereas the countries covered in this thesis are historically DB countries.

and risk management practices at DB pension funds and further necessitate changed governance structures and a different mode of pension fund regulation. This chapter proceeds as follows: In the next section, we will discuss the significance of pension provision in the context of global ageing. We will explain that population ageing will have significant implications for the societies in the OECD countries. The challenges the single countries face depend strongly on the structure of their pension system. In the third sections will therefore describe the existing pension systems and theorise them more deeply in both a historical and social policy perspective. Fourth, we will discuss recent pension reforms and engage in the debate on these issues in selected OECD countries in a forward-looking perspective. The final section concludes.

2.2. Demography and ageing

As societies around the world are ageing, providing for retirement has inevitably become a topic of increasing importance. The implications of demographic change rank high on the political agenda of most countries. The path breaking publication of the World Bank in 1994, 'Averting the Old Age Crisis' may be viewed as the starting point of a vivid academic and public debate. The Organisation for Economic Co-operation and Development (OECD) followed in 1998 with 'Maintaining Prosperity in an Ageing Society' setting out the agenda to the ageing OECD societies. In 1999 the Working Party on Private Pensions was established which since then 'provides a forum for policy-makers from OECD countries to discuss public policy towards private pensions, with a focus on regulation' (OECD, 2003).

Population ageing is becoming a global phenomenon. Demographers expect the 21st century to become an 'era of population aging' as the world is in global demographic

transition from high fertility and high mortality rates to lower mortality and lower fertility rates (Bloom et al., 2008). As the proportion of old people in the total population is rising, a decreasing percentage of working population has to support a growing number of dependant people. The economic implications of global demographic change are significant. 'Demographics remain a central shaper of economic forces in society' (Shoven, 2011).

But the process of population ageing is not uniform and even. Different parts of the world are at different stages of the demographic transition. While parts of Africa and Asia are still faced with 'population explosion', population shrinking is expected to start in the low-fertility countries of Europe and Japan. In general, population ageing is most advanced in the industrialised countries, where it started 40 years ago, but it does not always follow the traditional line between industrialised and developing countries. China is the outstanding example of a rapidly ageing developing country. Also within the industrialised countries the disparities are large and secular trends are further amplified by baby-boom and baby-bust generations in the post-war period. By geographic regions, the extent of population ageing is most pronounced in Europe; by single countries, Japan has the oldest population in the world. The United States, in contrast, still has a relatively young population.

Improved health care and living conditions due to increasing prosperity are seen as the main reasons behind this secular process of rising life expectancy throughout the world, which started in the 19th century. During the 20th century mortality risks declined strongly. Especially the decline of infant mortality was an important factor in increasing overall life expectancy. In the period from 1950 to 1955 until 2005 to 2010 life

expectancy at birth for both sexes increased from 66 to 77 years in the more developed world and is forecasted to rise to 85 years up to 2100[33]. Furthermore, fertility declined strongly: In many OECD countries fertility rates fell below the notional replacement rate of 2.1 children per woman. 'Lowest-low fertility' with period total fertility rates below 1.3 were observed in the 1990s in some European and East Asian countries; demographers discussed the 'end of population growth in the 21st century' (Lutz et al., 2004) and the possibility of 'population implosion' (Chesnais, 2001; Lutz and Skirbekk, 2005 and 2006; Kohler et al., 2006). The United States are the notable exception among the industrialised countries where the total fertility rate stayed with 2.1 close to the replacement level (Preston and Hartnett, 2011). In Western Europe, the average number of births per woman declined from 2.7 births per woman during the baby-boom peak in the mid-1960s to a low of 1.5 in the mid-1990s and has recovered only slightly since. This holds true for Germany in particular where the fertility rate fell to 1.3, whereas it remained at close to 1.8 in the United Kingdom.

Current birth patterns widely determine population trends and structures of the next decades. Future fertility patterns are a crucial variable for the population prospects in the more remote future. In 2010, the United Nations routinely revised their population projections and extended the projection horizon from 2050 to 2100. The most significant change is the new assumption that fertility will converge towards replacement-levels in the long run. 'Lowest-low fertility' is increasingly seen as a transitory phenomenon as women delay childbearing from younger to older ages (Goldstein et al., 2009). For these

[33] United Nations: World Population Prospects, The 2010 Revisions, Available at: http://esa.un.org/unpd/wpp/index.htm, [accessed 26/06/2012]

reasons, the United Nations now expect the population is now expected to stabilise within three to four generations, which represents an important change from earlier forecasts.

Even though the demographic burden may therefore prove to be a transitory phenomenon, most industrialised countries are faced with this phenomenon of population ageing and its consequences over the next decades. Their age structure will change significantly at least up to 2050. We focus here on this period and leave out the more distant future. Migration is usually seen as a factor being able to mitigate the imminent trends but not to change them altogether[34]. Net immigration is traditionally an important factor of population growth in the United States (Shrestha 2007). But net migration flows also became the pivotal element in delaying European populations from entering the stage of decline. As immigrants are mostly aged 20-30 years on arrival, immigration not only increases the population but also changes the age structure of the population thus strengthening the labour force. In some European countries the impact of immigration was above 1 percent over the last 50 years; Germany was found to have been most impacted of all European countries with 2.6 percent (Philipov and Schuster, 2010). High-skilled immigration is found to offer some relief from the demographic burden in Europe (Docquier, 2012). Successfully integrating immigrants into the EU's economy will therefore be increasingly important[35].

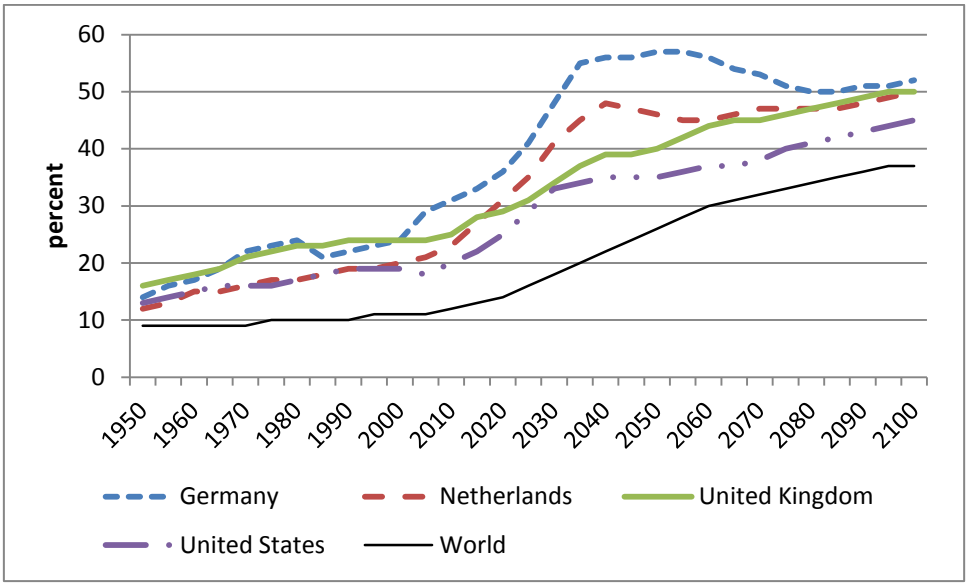
[34] The United Nations showed in a simulation that the extent of immigration required to counterbalance demographic ageing in the industrialised countries would be so large as to prove socially and politically unacceptable. United Nations (2000). "Replacement Migration: Is It a Solution to Declining and Ageing Populations?" Available at: http://www.un.org/esa/population/publications/migration/migration.htm, [accessed 26/06/2012]

[35] 2009 Ageing Report: Economic and budgetary projections for the EU-27 Member States (2008-2060). European Economy 2, 2009. Available at: http://www.operationspaix.net/sites/politiquessociales.net/IMG/pdf/2009_Ageing_Report.pdf , [accessed 26/06/2012]

While the population of the United States is forecasted to grow robustly albeit significantly slower than ever before over the next 50 years, the population forecast for the EU is overall flat and contingent on the assumptions on future migration. Excluding migration, the EU population is expected to peak in 2015 and to enter the phase of decline afterwards. The latest population projections by Eurostat assume that net migration will retard the natural decrease of the population until 2035. Still, the EU working population, i.e. the population aged between 15 and 64 years, is expected to start to decline by 2010 and to drop by 15 percent up to 2060. This figure masks a considerable variability ranging from a decline in the working age population of nearly one third in Germany to a continuously small increase in the United Kingdom. In comparison, the working age population in the United States is expected by the United Nations to post an overall increase of about 20 percent in the period up to 2050.

Population ageing is expected to accelerate in all of these countries albeit to differing extent with Germany being most exposed to it and the United States the least. For Western Europe the old-age dependency ratio is expected to rise from 28 percent in 2010 to 50 percent in 2050. This represents the highest old-age dependency ratio in the world. But even though the United States is still growing it is also getting older at the same time: The old-age dependency ratio is expected to rise to 35 percent in 2050 compared to 20 percent in 2010.

Figure 2.1: Old-age dependency ratio: Ratio of the population aged 65 years or older to the population aged 15-64, Medium variant



Source: United Nations: World Population Prospects, 2010

These 'seismic shifts' (Little and Triest, 2001b) will have significant implications for the societies of the OECD countries. Demographic change will impact all aspects of social and economic fabric of our societies. In a rather crude ceteris-paribus macroeconomic view, the forecasted shrinking labour supply will reduce overall production and thus economic wealth. Standards of living will fall. As labour becomes scarce relative to capital, wages will rise thus reducing the propensity to save. But there are important caveats: First, the working age population is not equal to employment. Labour force participation rates typically vary according to socio-economic criteria, most importantly age and gender, and across countries. Second, productivity is not exogenous. Productivity growth can potentially counterbalance some of the negative growth impacts of population ageing, although it is difficult to verify empirically. And third, the above outlined production equation holds true only in a closed economy. In reality we live in

open economies with rather unrestricted international capital flows which can potentially modify the impact of population ageing in each country (Ogawa and Takayama, 2006). [36]

There is a large academic literature on these issues, which we will try to summarise very briefly as it would otherwise go beyond the scope of the thesis. The impact of demographics on economic growth was conversely discussed. Earlier research stressed a lack of significant correlation between population growth and economic growth. By incorporating age-structure changes into the modelling this assessment changed. The theoretical framework was developed by Barro (1991) and subsequently extended by a number of Harvard economists (Bloom and Williamson, 1997, 1998) as summarised by Kelley and Schmidt (2005). In general, demographic change is now expected to impact economic growth. Higgins (1998) and Miles (1999) found evidence of a powerful impact of demographic ageing in lowering national savings. The 'asset market meltdown hypothesis', which was controversially debated mainly in the aftermath of the 2000 stock market crash, further sustains this argument by drawing the scenario of falling capital market prices as the retiring baby boomers decumulate their assets to sustain consumption. In the academic literature, there is no consensus on the asset market meltdown hypothesis. While Poterba rejects it as there is little robust evidence of an empirical relationship between financial assets and demographic change (Poterba, 2001), 2001) others either support the argument that demographic variables can exert significant

[36] A fourth caveat refers to the reliability of demographic forecasts. While - unlike most economic forecasts - demographic forecasts are to some extent built on events that have already occurred, as e.g. births, other components, such as the further increase in longevity or future fertility rates are more uncertain. And this holds true for migration flows in particular. Not surprisingly, also demographic forecasts are regularly revised. Notwithstanding these reservations, the broad trends are generally regarded as reliable.

influence on asset prices (Abel, 2001; Davis and Li, 2003), or do not outright reject it (Campbell, 2001).

More recently, the focus has shifted to the question if the economic impact of demographic change can be compensated. In general, the literature gives evidence to the suggestion that a slowdown in labour supply will be partly offset by an increase in productivity (Little and Triest, 2001a). Börsch-Supan et al. (2006) show in a multi-country-model allowing for international capital flows that 'open economies are able to diversify a great deal of the demographic effects that depress savings and the rate of return of capital'. In a later study, the authors show that well-designed pension reforms have the potential to offset the force of ageing (Börsch-Supan and Ludwig, 2011).

The fiscal implications of population ageing are undisputed: Many countries face increasing fiscal problems financing their pension systems. According to the OECD (2011), public expenditure on pensions increased from 6.1 percent in 1990 to 7 percent in 2007 and constitutes often the largest single item of government expenditure. Fiscal headaches provide a major impetus for reforming pension systems.

2.3. Mapping the pension landscape

The narrative of pension systems is geographically uneven. Whereas continental Europe created comprehensive public pension systems, the Anglo-American countries traditionally focused more on private pension arrangements mostly via the employer, what we refer to as the occupational pension system. Basically, the Anglo-American system is characterised by a comparatively small mandatory state pension system providing a basic minimum old-age income and in addition a large voluntary pension system which was traditionally supplied for by the employers. The 'classical' continental

pension system is characterised by a large mandatory PAYG financed state pension system and a rather small voluntary funded private pension system, epitomised here by Germany. The Netherlands provide a generous pension benefit from a combination of a de-facto mandatory pension fund system and a basic public pension system. Appendix 2.1 provides more details on the different pension systems.

We proceed this section by, first, explaining the different concepts of pension provision. Second, we will theorise pension systems in the broader context of the welfare state to gain deeper insights into the governing social paradigms. This will be followed by an overview of the various systems of pension provision in a historical perspective

2.3.1. Taxonomy of pension provision

There are many ways to organise pension provision. As Barr and Diamond (2009) point out, pension systems have multiple objectives which shape the choice of pension design. The major objectives are consumption smoothing and insurance from the point of view of the consumer as well as poverty relief and redistribution from a governmental perspective. Accordingly, we can distinguish between pension systems which provide a flat, basic pension, thus focussing on preventing old-age poverty, and pension systems which aim at replacing work income, thus focussing on consumption smoothing. A second way is to classify pensions by the sector they are provided from: Pensions can be either provided by the State or by the private sector. The latter case can be further distinguished if the individuals provide individually for old-age or if pension provision is linked to employment. The systems can be further classified by the way they are financed: Pension systems can be either pre-funded with the pension capital being accumulated during the individual's working life and starting with retirement paid out as

an annuity or lump sum. Or pension systems are PAYG systems with current pensions being paid out of current contributions, taxes or from other sources of income generated in the same period. In the Western world, state systems are mostly PAYG, whereas occupational and private pension arrangements are usually funded[37]. Widely used by the governments of all of the here analysed countries and shared by many academics analysing pensions is the traditional Three-Pillar-Concept which distinguishes between the State pension, occupational and voluntary pensions.

The OECD distinguishes, first, between public and private pensions. Public pension plans aim at providing retirement benefits for the entire population; they are traditionally PAYG-financed in the OECD area, albeit increasing combined with pre-funded elements. Private pension plans are administered by non-governmental institutions. Second, a combined functional and institutional approach to private pension systems is applied[38]. In an institutional perspective focussing on the characteristics of institution providing pension benefits, the taxonomy distinguishes between autonomous, non-autonomous pension funds and insured pensions. Functionally, pension plans can be occupational or private, voluntary or mandatory. By OECD definition, private pension plans are funded; private pension plans can be either of DB or DC type (Yermo 2002).[39]

[37] The exceptions from this rule are here the public pension reserve fund in the United States and the traditionally PAYG financed occupational pensions in Germany.

[38] This paragraph refers to the taxonomy provided by the Private Pension Department of the OECD, which is structured around three key terms, pension plans, pension funds and pension entities. Pension plan refers to the legally binding contract codifying the entitlement to receiving retirement and possibly additional benefits. Pension funds refer to the pool of assets which can be established to fund the pension plan. And finally the pension entity is defined as the special-purpose legal entity that owns the pension fund and may also control it.

[39] This approach tries to operationalise abstract principles into tangible characteristics of pension delivering institutions ('tick the box') but fails to recognize the endogenous nature of institutional structure (Merton and Bodie, 2005).

The World Bank on the other hand applies a purely functional concept to pension systems: Following their analysis that financial pension systems have three main functions, redistribution, saving and insurance, the World Bank (1994) developed a pension system consisting of a 'publicly managed system with mandatory participation', a 'privately managed system with mandatory participation' and a 'privately managed system with voluntary participation'. Whereas the first represents the redistributive element to reduce old-age poverty, the latter two are intended to provide for savings and insurance[40]. In 2005, the World Bank further refined its conceptual framework by extending its Three-Pillar-Concept into a Five-Pillar-Concept, adding a 'social pension' as first basic layer of universal support as pillar Zero and a non-financial fifth pillar which includes all other available support for the elderly (World Bank, 2005).

We will generally apply the OECD definitions as the OECD is the organisation of the developed world and the OECD definitions are therefore regarded as more appropriate in the context of this thesis. But we will resort to the World Bank concept when outlining apparent changes of the pension systems. Nevertheless, we recognise the shortcomings of the OECD taxonomy. The combination of 'function' and 'institution' tries to operationalise abstract principles into tangible characteristics of pension delivering institutions ('tick the box') but fails to recognize the endogenous nature of institutional structure. We therefore see it ill suited to capture the rapid institutional change in the funded pension landscape. Functional and structural finance as developed by Merton and Bodie (2005) might offer a more robust framework.

[40] These systems were subsequently introduced in parts of Latin America, Eastern Europe and Russia, where new pension systems had to be built from scratch, but mostly failed to attract public support in the United States or Western Europe with their historically grown pension systems.

We conclude that different countries have implemented very different pension systems. We share the assessment of Barr and Diamond (2009) that there is no single best pension design. Different countries have successfully implemented very different pension systems. In the next section we will provide a welfare theoretical perspective on pension systems as 'classification of welfare states and the subsequent identification of ideal-types can give an approximate picture of the range of options available to policymakers for policy reform' (Bonoli, 1997).

2.3.2. Pension systems in a welfare perspective

Pensions are usually the most important form of social benefit. From our taxonomy of pension provision it is already obvious that the public-private mix forms an important characteristic of pension systems. Esping-Andersen, one of the foremost contributors to the debate on the changing nature of welfare states in the Western societies, theorised welfare provision in the nexus of the state and the market. In his path-breaking book 'The Three Worlds of Welfare Capitalism' (1990) he proposed a classification according to the degree of decommodification, which is defined as 'the degree to which individuals or families can uphold a socially acceptable standard of living independently of market participation'. Thereby, he transcended both the traditional quantitative and the functional approaches to welfare theory. While the first focussed on the social security expenditure in a purely quantitative approach, the latter classifies welfare states according to their objectives in a historical perspective. Public pension systems followed from the beginning different welfare objectives; they were constructed either on the Bismarckian or Beveridgean model (Werding, 2003). The former represents the contributory social insurance model characterised by a strong link between pension provision and employment with regard to both coverage and

contributions focused on income maintenance. The latter represents the universal welfare state characterised by universal provision and flat-rate tax-financed benefits aiming at poverty prevention. Though this classification captures the goal of pension provision it fails to take into account the different level of welfare provision and further dimensions such as the gender divide (Bonoli, 1997).

Esping-Andersen opened a sociological perspective on the welfare state. Not only the 'how much' but also the 'how', the 'to which goal' and 'with what result' questions are important for understanding the conception of welfare systems. The private-public mix in social protection provides thereby the structural context for analysing welfare-state regimes as the state and the private sector are closely intertwined in welfare provision. Esping-Andersen classified welfare states into the three different types, the conservative welfare capitalism, the liberal model and the social-democratic model. The Anglo-American model constitutes the liberal model of the welfare capitalism being based on individualism and the primacy of the market, whereas the continental European countries represented the conservative welfare capitalism in which the 'liberal obsession with market efficiency and commodification was never pre-eminent [...] and such the granting of social rights was hardly ever a seriously contested issue'. The third ideal-type of welfare states is the social democratic welfare state which is represented by the Scandinavian countries which 'promote an equality of the highest standards, not an equality of minimal needs as was pursued elsewhere' (Esping-Andersen, 1990). The relevance of the public-private mix is high in pension provision in particular where the state is instrumental in shaping both spheres. Esping-Andersen derives at a two-dimensional classification of pension systems based on the level of expenditure and the source of retirement income in a sectoral analysis. The corporatist state-dominated

insurance system is characterised by a marginal private market and a highly occupationally segregated social security provision, whereupon in residual systems the private market prevails. The third type is the universalist state-dominated system which provides universal social rights.

The classification of countries is not undisputed as, firstly, 'there is no single pure case' as in reality all countries contain elements of all types and, secondly, state activities and welfare systems undergo historical transformations. Rather undisputed is the classification of Germany, the United Kingdom and the United States. But the 'Dutch enigma' (Esping-Andersen, 1999) was always controversially discussed. Some authors have placed the Netherlands in the continental conservative cluster of countries, see e.g. Visser and Hemrijck (1997). Zingel (2007) points out that while the general principle of public pension policy in Germany is focused on income replacement where the public pension depends on the contributions paid-in by the individual thus establishing a strong individual adequacy of public pensions, the Netherlands grant a universal but basic pension aimed at preventing old-age poverty thus sharing the Anglo-American Beveridge tradition. In our view, the difficulties to classify the Netherlands are rooted in the ambiguity of the Dutch occupational pension between the state and the market. The Netherlands combine corporatist labour market institutions with a largely funded pension system (Engelen, 2006). Its generosity is high compared to the Anglo-American countries (van Riel et al., 2003). The Dutch pension funds operate under a state mandate with universal membership but are heavily dependent on private financial markets to meet the ambitions of the state's pension policy. We would therefore suggest that the Dutch pension system resembles mostly a universalist public-private partnership.

This classification of the different pension systems provides us with important insights into the understanding and the significance of private pension funds. In the German corporatist state-dominated insurance system, the role for private occupational pension provision was traditionally rather limited[41], whereas DB pension funds became important providers of old-age income especially for the middle classes in the United Kingdom and the United States. The Netherlands established an important market-based funded pension system to complement state pension policy.

2.3.3. Pension systems in a historical perspective

This section offers a historic perspective on pension systems in order to better understand the current pension debate. Werding (2003) argues that today's differences between pension systems date back to their historic origin in the late 18th century. The view that the variations across present-day pension systems root deeply in history is shared by most scholars of welfare theory (Esping-Andersen, 1990; Bonoli, 1997; Thane, 2006; Ebbinghaus and Schulz, 2007).

The development of old-age pensions is closely connected to the emerging industrialised societies of the late 19th and early 20th century. The need for formalised pension arrangements is mostly linked to the social and economic eruptions resulting from industrialisation which weakened the role of the family as traditional supplier of welfare. From the start both the state and the private sector were involved in providing pensions. Thus, today's public-private pension mix developed over time. Private pension arrangements usually preceded the introduction of formalised state pension systems.

[41] This holds true for the entire provision of occupational pensions in Germany. Traditionally, occupational pensions were – and still are – mostly constructed as book reserves without pre-funding thus providing long-term stable financing to the companies. For further detail see section 4.2.1.

Friendly societies and other thrift organisations provided life insurance protection to their members to alleviate old age poverty. The State and large corporations started to provide distinctive groups of employees with pension provisions thus providing the necessary financial means for employees to leave employment at a fixed retirement age. These pension benefits were provided in a paternalistic way mostly with the aim of better managing the workforce. In these early days, the development of occupational pensions was fairly even between the countries; industrialisation was the main factor behind the spread of pensions among the employees of large corporations and the state. There is thus a close connection between economic change and employer pensions (Thane, 2006). We can draw important lessons from this historic observation for more recent developments as we will show later in the section on the shift from DB to DC. As Sass (2006) points out, 'employer plans are creature of the modern industrial economy' and had by the end of the 1930s spread quite evenly throughout the industrial world.

In most countries the introduction of formal public pension systems did not occur until well into the 20th century. The first compulsory national public pension system was introduced in Germany in 1889 under Reichskanzler Bismarck; the United Kingdom passed its first pension law in 1908, the Netherlands in 1913 and the United States only in 1935. Old-age poverty was increasingly recognised as an important political issue (Azra and Johnson, 2006).

The Second World War marked a decisive caesura for pension provision. This holds true especially for continental Europe as many pension plans did not survive destructions and hyperinflation. This experience applied to formerly funded State pension systems as well. Only after World War II did e.g. the German pension system change to a

PAYG basis. As the accumulated funds were lost, a PAYG system was seen as they only viable way of providing pensions to the generation which was to retire after the war. As the private sector was deprived of resources to supply pensions, in continental Europe the decade after World War II marked the beginning of the social paradigm of comprehensive retirement income provided by the state. The development of public pensions is seen to be embedded in the growing social engagement of the state in general which we can observe during the 20th century and has thus to be analysed in the context of the political economy of state power.

While the social paradigm of comprehensive welfare was shared throughout continental Europe, the approaches to providing retirement income differed though. The Netherlands did not join the European bandwagon in building a large public pension system. While World War II undoubtedly marked a turning point also for the Dutch pension system, the Dutch nevertheless continued their employment-based pension arrangements with corporatist administration which root back to the pre-war period (Anderson, 2004). These occupational pension arrangements were developed in the 1950s into what became the powerful Dutch pension funds, which are nowadays major players in global finance.

The Anglo-American countries on the other hand continued their retirement policies and systems rather unabatedly. An economically stronger private sector and political culture more resilient to an active role of the state impeded the development of comprehensive State pension systems. 'Employer plans would thus remain a significant source of income in what came to be known as "Anglo-Saxon" as opposed to "Bismarckian" retirement income systems' (Sass, 2006). The 1942 Beveridge Report

outlined the fundamentals of the modern welfare state in the United Kingdom. It proposed a uniform and universal system of social insurance extending basic but sufficient benefits to everybody thus averting the social stigmatisation of the poor. The Beveridge Report aimed at the establishment of comprehensive social insurance in post-war United Kingdom. It was pointed out that the strong resonance this report found in the public was closely linked to its appearance in the phase of strong social solidarity in war and early post-war time (Baldwin, 1990). But as the government did not share public enthusiasm, its implementation was delayed and its intended benefit scope strongly reduced (Abel-Smith, 1992).

The United States on the other hand never shared European welfare objectives. A public pension system was introduced only under the New Deal in 1935 in the midst of the social despair of the Great Depression, thus lagging other industrialised countries considerably. But the New Deal also laid the ground for the rise of organised labour, which in turn became an important force behind the significant growth of private sector employer plans in the post-war decades (Ghilarducci, 2006). The rise of 'Pension Fund Capitalism' (Clark, 2000) originated in the post-war period of strong economic growth and stable employment relationships.

Myles (2002) concludes that 'modern retirement is a result of the rising affluence associated with the long post-war boom from the 1950s to the 1970s'. The expansion of mandatory public pension systems is seen as providing equal access to retirement thus avoiding or mitigating the skewed wealth effects of voluntary pension schemes (Myles, 2002). But the role of the state in pension provision transcends its role as operator of the

public pension system. Many scholars underline the important role of the state also in facilitating the private pension system (Esping-Andersen, 1990; Engelen, 2006).

In this chapter we wanted to underline that the differences in pension systems we observe today are deeply rooted in different historical experiences and social and political traditions of each country. There are three important points we would like to make here: First, different countries established very different pension systems. Second, pension provision was from the start a mixture of public and private activity with the state being instrumental in shaping both spheres. Third, pension systems are part of the social security system, and, as Börsch-Supan (2000) remarked, 'the concept of social security means different things in different places'. Pension funds are deeply embedded (Grabher, 1993).

2.4. Changing pension systems

Over the past 25 years, pension systems in OECD countries changed substantially. In continental Europe change was mainly orchestrated by governments reforming their public pension systems with the goal of restoring financial sustainability. Formerly generous public pension promises are being scaled back; the role of the private sector needs to grow. In the Anglo-American countries the more significant changes could be observed in the private pension sector, namely the demise of the DB pension system. We make the argument that this was caused by market forces and further aggravated by regulation.

It is widely recognised that demographic change necessitates pension reform as population ageing per se increases the cost of pension provision. This argument is usually applied to the public pension systems; the goal of pension reform in this context is to

preserve fiscal sustainability. This goal has dominated the European pension reform debate as the rapidly ageing countries of the European Union are faced with especially daunting prospects on public pension systems. Rendering public pension systems financially sustainable translates inevitable into reducing pension claims which raises questions of adequacy and reliability of public pension promises. Privatising pension provision is often seen as a solution to preserve the adequacy of the overall pension benefits. The transition from a PAYG public pension system to a funded private pension system was thus an important issue of debate in the European Union but also in the United States.

Economic change on the other hand has already become a powerful factor changing the private pension landscape in the OECD. Long-term economic transformation is seen as an important reason for the decline in DB pensions (Clark 2005). This change is most apparent in the demise of the occupational DB pension systems in both the United States and the United Kingdom with the subsequent change to DC pension plans. Pension reforms in both countries focussed on increasing the safety of the private pension plan – although with the allegedly unintended consequence of accelerating the decline of DB pension plans (Byrne et al., 2006). But the impact of economic change is also felt in the occupational pension systems in the Netherlands and Germany. The change from DB to DC led above all to a changed distribution of pension risks.

But the need for pension reform results also from societal changes more broadly, the changing gender balance being one of them. Esping-Andersen (2009) recently focused on the societal changes resulting from the changed role of women in the

industrial countries, pointing out the further challenges involved for the financing of certain welfare benefits and warning of the upcoming new disequilibria in our societies with regard to education of children and population ageing. Further discussed is the impact of changing labour markets with a growing number of people in precarious employment and the challenges posed by migration and an increasingly internationally mobile workforce (Hemerijck, 2002; Engelen, 2006) We would argue that this goal of pension reform has hardly been taken up and remains a challenge for the future[42].

We can thus conclude that the need to adjust to demographic, economic and societal and changes transforms the inherited pension systems and thus changes the context for DB pension funds. We further proceed this section by theorising more deeply the issues at stake focussing on the intertwining roles of the state and the market. We will group this according to the sector initiating the changes, i.e. the state versus the market, thus following the outlined rationales for pension reform. This will be followed by a brief description of the policy changes that could be observed in the different countries.

2.4.1. Demographic change challenges public pension systems

There is wide consent, that systems, which rely to a high degree on State pensions are to become financially unsustainable as public expenditures for pensions will increase considerably and pose a rising burden on the working generations eventually beyond social and political acceptance: 'Demographic changes will increase implicit public debt in a way that is unsustainable even for rich countries' (Börsch-Supan, 2001). As we showed in section 2.2., the European countries are more exposed to population ageing

[42] The European Commission adopted a proposal (2005/0214 (COD)) for a directive on improving the portability of supplementary pension rights already in 2005, but this has not yet been implemented.

than the United States. The financing problems facing the public pension systems were generally seen as rather modest for the United States (Munnell, 2003) but pressing for many countries of the European Union, where the diminished cohorts following the baby boomers would have to shoulder the burden of paying generous PAYG pension benefits for a disproportionally large number of pensioners, which gave rise to concerns of intergenerational equity apart from social and political acceptance. Nevertheless, the European Union experienced a long period of reformatory deadlock in many countries of during the 'Eurosclerosis' of the 1980s, when it was doubted if the welfare systems are able to change at all. Esping-Andersen (1996) diagnosed 'frozen institutional landscapes' Pierson (2002) argued that faced with 'permanent austerity', resulting from a combination of global economic competition and population ageing, European welfare states are changing significantly, but that this change focuses on 'the renegotiation, restructuring and modernization of the terms of the post-war social contract rather than its dismantling'. Finally, pension reform gained priority on the European agenda[43]. Many OECD countries implemented major pension reforms since the second half of the 1990s, leaving the United States as one of the few countries without significant change to the public pension system since the 1980s (OECD, 2009).

Even though radical approaches were discussed on both sides of the Atlantic, incremental change leading to path departure (Ebbinghaus, 2005) is found to have been the dominating reform approach to pensions in the developed countries (Whiteford and Whitehouse, 2006). The thus available reform options were set out by Disney (2000). The

[43] In 1997, the Green Book on 'Supplementary pensions in the Single Market' stressed the need to reform state pension systems arguing that EU Member States should instead rely more on 'pension schemes linked to employment (pillar 2)' and 'pension schemes taken out by individuals, usually with life insurance companies (pillar 3). Available at: http://ec.europa.eu/internal_market/pensions/docs/com-1997-283/com-1997-283_en.pdf, [accessed 26/06/2012]

available policy options can be grouped around the three main blocks, raising contributions, decreasing pension benefits and delaying retirement. While raising contributions is generally seen to impede economic growth, decreasing pension benefits was a widely enacted policy response. In the OECD countries pension benefits were on average reduced by 22 percent for men and by 25 percent for women (OECD, 2009). Increasing the retirement age or - more precisely - linking the retirement age to expected longevity was identified as a key policy in parametrically reforming PAYG systems (Schmähl, 1990; Disney, 2000). Increasingly this focus is broadened into rising workforce participation more generally with a focus on increasing female workforce participation (Whiteford and Whitehouse, 2006). Building his argument on the comparatively low workforce participation of the healthy elderly and women, Börsch-Supan and Ludwig (2011) demonstrated that living standards in continental Europe can actually be stabilised by a 'smart combination of labor market and pension policy' thus setting out the future European pension reform agenda in a macroeconomic context.

In a more radical approach, a solution to fixing the allegedly 'broken' PAYG public pension systems is seen in replacing them with funded pension plans. This option is open for young rather than mature PAYG systems as the double-payer problem of the active generation having to provide both for the pension rights of the retirees and their own pension benefits contradicts the radical change from PAYG to funded systems (Myles and Pierson, 2001). The path-breaking change from a PAYG pension system to a mandatory funded pension system was accomplished by Chile in 1981 (Arenas de Mesa, 2008). The much noticed pension reforms in Scandinavia were gradual in comparison as statutory funded pensions were introduced to supplement a basic PAYG state pension (Ebbinghaus and Gronwald, 2011). In the United States this debate was pioneered by two

Advisory Councils under President Clinton (1996) and President Bush (2001). Both reports included a proposal to move to mandatory funded individual accounts, thus effectively privatising the system (Diamond, 2006; Cogan and Mitchell, 2009). This proposal has not been implemented. Whereas in the United States the debate PAYG versus funding was led in the context of the public pension system only, i.e. providing basic pension benefits on a mandatory basis via the markets, in the European Union this debate resulted in a partial retreat of the state out of pension provision. Following the scaling down of public pension benefits, the question was asked if and how funded private solutions could be employed to 'close the pension gap'.

The debate on the respective superiority of a PAYG versus a funded pension system and the following question, if countries should change from a PAYG to a funded system, has been highly controversial. Economists researching pension issues focus on reputed efficiency gains to be reaped from a transition from a PAYG to a funded system and the transition problems involved. Although the debate is not over, a far-reaching consent seems to have been reached that a combination of both systems is the best way forward. Summarising this debate, Sinn (2000) claims that 'in present value terms there is nothing to be gained from a transition to a funded system even though the latter offers a permanently higher rate of return', as the higher return of funded systems is only achievable by equity investments where the on average higher return is in a welfare perspective offset by the higher risk involved. But Sinn concludes that 'nevertheless, a partial transition to a funded system may be a way to overcome the current demographic crisis because it replaces missing human capital with real capital and help smooth tax and child raising costs across the generations. Rebalancing European pension system towards

funded pension funds is therefore seen as to be without alternative, although the risks involved are clearly recognised (Clark, 2003b).

This debate was very influential on pension policy in many countries of the European Union as it theoretically underpinned what we term here the 'New European Pension System'[44]. The German pension reform can illustrate that claim: The pension reforms allegedly changed the social paradigm in Germany not only by acknowledging that the state pension alone would in future not suffice for an adequate pension but also by reverting to the market in closing the gap (Hinrichs, 2005). Thus, the pension systems are reconstructed by reducing future benefits from public pensions and encouraging private funded pension plans leading to a partly privatisation of pension provision: Market-based pension provision replaces state-based pension provision. But the market forces are not left untainted. By weaving a web of monetary incentives and tight regulation a legislative framework is attached to achieve market efficiency. In this system the government employs the market for producing welfare. The success of these pension reforms depends on the working of the market according to the state-set guidelines. Drawing on Esping-Andersen (1996) the conservative welfare state develops in the direction of the liberal model while aiming at social-democratic universality. Under this system, the significance of pension funds will rise but these 'New European Pension Funds' differs conceptually from the traditional occupational DB pension funds. The 'New European Pension Funds' are explicitly an integrated part of Governments' pension policy whereas the traditional occupational DB pension fund was usually conceptualised in terms of companies' human resources policy. This will have implications for the governance structures and finally the risk attitude of these institutions.

[44] This paragraph draws on Clark (2006) theory of pension fund regulation.

2.4.2. Economic change transforms private pension systems

The rise of DB pension funds was closely connected to the post-war period with strong economic growth and stable employment relationships[45]. The DB pension plan was the traditional way of pension provision in all industrialised countries. This has changed dramatically as DC pension plans have become the dominating model of occupational pension provision in most countries (Clark and Urwin, 2011).

The reason for this shift from DB to DC is usually seen in economic change further accelerated by changes in the regulatory environment (Munnell, 2006). The structural change from manufacturing towards service sector in the Anglo-American countries and the increased international cost pressure in the globalised world drove the demise of DB (Clark, 2005). Changing labour markets further expedited the redesigning of occupational pension contracts. The long-term retention bonus which characterises DB pension plans was increasingly seen to hinder an efficient allocation of labour by restraining job mobility (Engelen, 2006). During the 'Golden Age of Capitalism' (Marglin and Schor, 1990) DB pension plans were consistent with the management of the work force as both retention and retirement goals could be obtained. Final salary plans motivate employees to stay with the company as the financial loss in case of job change is disproportionate high and financially enable and encourage them to retire in line with the politics of the company (McGill et al., 2010). The transformation of the economy with the

[45] Clark (2000) argued that 'Pension Fund Capitalism' in the Anglo-American world was based on (1) the institutional framework provided by the development of the institution 'pension fund', the prevalence of long-term wage contracts and the Anglo-American preference for market-based solutions, (2) the post-war economic and demographic conditions of unabated growth, and (3) the government policy demanding asset funding of pension promises thus initiating the process of collecting and investing pension contributions.

decline of the manufacturing sector and the increasing share of the service economy favoured individualised pension solutions instead of collective ones. The economic rational underpinning DB pension plans faded. We can observe though a distinct pattern of the type of pension provision according to industry sector which can be linked to the required skills of workers which explains why in some industries DB pension benefits are still an important form of pension provision (Clark and Urwin, 2010). But for many companies DB pension funds constitute legacy costs (Monk, 2008). Furthermore, the wave of mergers & acquisitions eroded the ability of many firms to act as long-term guarantor of the pension promise (Keating, 2010). Also, the argument is made that younger workers do not appreciate DB pensions but prefer the portability and tangibility of DC plans (Munnell, 2006; Clark and Urwin, 2010).

Parallel to the changing economic environment also the modes of pension fund regulation and the rules for pension accounting changed. These changes are seen by an increasing number of scholars as an important reason for the demise of the DB pension fund system as they eroded the pension-risk-taking capacity of employers (Klumpes and Whittington, 2003; Boeri et al., 2006; Nugée and Persaud, 2006; Sender, 201). The changed regulation and accounting rules reflect in our view a changing understanding of pension risk. We will develop this argument in more detail in chapter 3.

All these trends were dramatically amplified by the Global Financial Crisis. Significant investment losses in traditional and new asset classes and the dry-up of market liquidity shattered the wisdom of pension risk management. Funding deficits requiring additional contributions from the sponsors or a lowering of pension benefits further

devastated the world of DB pension funds and accelerated the transformation of the private pension landscape.

The shift from DB to DC is mostly associated with the changing Anglo-American pension landscape. In the United States the change from DB to DC has been occurring gradually over the last 25 years, with important implications for the retirement wealth of future generations of retirees (Poterba et al., 2007). In the United Kingdom it occurred more like a landslide as DB pension funds were closed at unprecedented rates since the turn of the century. Employers replaced their DB pension funds with DC plans but at much lower contribution rates. As the British state pension is especially meagre, the demise of DB in the United Kingdom implies a significantly impaired pension outlook for British employees. As the pension fund systems in both the United Kingdom and the United States are organised on principle of voluntary sponsorship the impact of economic change was powerful and unabated by policy interference. The de-facto mandatory corporatist Dutch pension fund system orchestrated adjustment to global economic change differently by renegotiating the pension design and restructuring the risk-sharing mechanisms. By making also benefits flexible, the burden of adjusting to rising cost of pension provision was shifted stepwise from employers to members, both active and retired. The Netherlands thus moved closer to a DC system but without sacrificing the collective approach to pension provision (Kortleve and Ponds, 2009).

The move from DB to DC has two main implications: Risks are shared differently under these systems and the extent of individual decision-making differs. First, in the case of a pure employer-sponsored DB system, investment and longevity risk are borne by the employer; the pension benefit is riskless for the employee apart from the bankruptcy risk.

Under a pure DC plan all risks are imposed on the individual. In both cases, the allocation of risk can be mitigated by the Government by setting up pension insurance funds for DB plans or by demanding guarantees in DC plans. A further distinction is important in this context: Whereas DB pension funds are collective institutions thus able to share and redistribute risks and benefits between cohorts and generations, the individualised DC accounts are not open to redistribution policy. Risk management varies therefore with implications for the regulation of both systems. Second, whereas the traditional DB pension plan is paternalistic in nature, DC plans require active decision-making by the individual. Drawing mainly on the US experience, the shortcomings of DC pension plans have been academically researched. The wide debate focuses on behavioural issues: We learned from behavioural finance that the choices individuals make are not especially well aligned with the economic textbook of 'rational choice' (Kahnemann and Tversky, 1979, Kahnemann, 2003). This refers especially to low participation of employees, insufficient saving contributions and inadequate investment decisions (Benartzi and Thaler, 2001, 2007; Choi et al., 2005, Munnell, 2003, 2006, 2009; Clark et al. 2012). More fundamentally, financial literacy and the financial decision-making competence have been questioned (Lusardi and Mitchell, 2007 and 2011; Lusardi, 2008).

The unfettered individualism enshrined in pure DC pension plans is increasingly critically scrutinised. The 'new paternalism' (Mead, 1997)[46] or the 'libertarian paternalism' (Thaler and Sunstein, 2003) theoretically underpins new modes for improving individual's decision-making. In the field of pension policy, the focus is on increasing coverage and improving investment results (Clark et al., 2012). Both in the

[46] Conceptualised as a third way between the traditional, truly 'paternalistic' welfare state and the individualised neo-liberalism, the 'new paternalism' tries to correct suboptimal results without abandoning the basic idea of a market-led economy.

United States and in the United Kingdom tentative steps have been implemented surpassing the pure voluntariness of membership. The United States introduced with the Pension Protection Act 2006 the possibility of automatic enrolment with opt-out option; The United Kingdom followed this example with the construction of NEST. First experiences have shown that automatic enrolment proves to be a powerful tool against inertia of human nature[47] even though a more recent study rather dampens optimistic expectations (Beefermann and Becker, 2010). Second, much research by academics and practitioners has been devoted on designing default investment strategies in DC pension plans (Beshears et al., 2008; Mitchell et al., 2009; Antolín et al., 2010; Goda and Manchester, 2010). A further example of directed decision-making is the 'Save More Tomorrow' tool developed by Thaler and Benartzi (2004) to automatically increase pension contributions in line with the individual's income. Again, the aim of the new pension politics is to direct individuals' decision-making in a way that the result is considered superior to the individual decision.

2.4.3. Structural change requires institutional change

Furthermore, also the institutional design of the pension delivering organisation is undergoing significant change. Building on the insight that the 'institutions for pension management must have multi-generational permanence' (Keating, 2010) we can start with the claim that the traditional single-employer DB pension fund is probably not the institutional blueprint for the future given its lack of resilience to the dynamics of economic, financial and regulatory change. Structural change requires institutional

[47] See e.g. United States Government Accountability Office, 40(k) Plans: Several Factors Can Diminish Retirement Savings, but Automatic Enrollment Sows Promise for Increasing Participation and Savings'. Available at: http://aging.senate.gov/events/hr217bb.pdf, [accessed 26/06/2012]

change (Merton and Bodie, 2005). In the world of UK pension funds adaption was found to be governing principle of institutional change in response to environmental change (Clark and Urwin, 2010). Pension funds adapt to the new environment by changing incrementally within the scope set by the existing constraints Clark and Urwin note changes on three levels. First, a further professionalization is sought often within existing legal structures by employing additional expertise. An example is fiduciary management which is a partnership between the pension fund and the fiduciary manager. Under a 'fiduciary management' arrangement the pension fund transfer defined parts of the managerial tasks of the pension funds to professional pension fund management companies. This can comprise a broad range from proposing the strategic investment policy, constructing the investment portfolio, manager selection up to reporting and risk management (van Nunen, 2008). The fiduciary model delegates investment and risk management partly or completely to an external agency. Expertise is externally purchased. Carefully written contracts closely tie the reputation of the service provider to the interests of the pension fund. The delegated fiduciary model is a viable option especially for smaller plans to enhance investment and risk management. Fiduciary management started in the Netherlands and spread into the United Kingdom and Germany.

In a first stage, fiduciary management was conducted by specialised companies which were spin-offs from the pension fund they then consulted but wholly owned by them. These pension fund management companies then opened up in a second stage to third-party business. In a third stage investment banks and asset management companies entered the business. This is part of an overall blurring of the frontiers between the sectors in the pension industry which can be observed. There are examples of pension

funds turning into pro-profit businesses competing with life insurance companies, pension consulting companies extending into asset management by operating investment funds, newly founded companies specialising on buying-out the complete pension fund from the sponsoring company and life insurance companies operating multi-party pension organisations on a pro-profit basis. This has important implications for the governance at the institutions.

Industry-wide pension fund or multi-employer pension organisations more generally can be seen as a second solution to improving institutional design as they enhance the expertise of pension fund management and the resilience against macro-economic developments. Furthermore, they benefit from the merit of scale (Bikker and de Dreu, 2006; Ambachtsheer, 2009). These organisations are often organised by the social partners. The best-known examples are the de-facto mandatory funds in the Netherlands; more recently industry-wide pension funds were set up on a voluntary basis in Germany (e.g. MetallRente the pension fund for the metal- and electrical industry founded in 2001). In the United States they were based in the union movement and the rare cases to be found in the United Kingdom are mostly attributed to the privatisation policy of the1980s. These organisations may be subject to severe accountability and governance problems as they represent variable stakeholder interests (Cyert and March, 1963).

Third, new public utilities offer the institutional structure for combining the governments' pension policy agenda with a market-based production system (Clark and Urwin, 2011). This clearly applies to the planned National Employment Savings Trust (NEST), but also the Dutch industry-wide pension funds could be clustered in this section. We suggest that both systems closely resemble the World Bank's Second Pillar

System which is privately managed but with mandatory participation (World Bank, 2005). In principle also the new German industry-wide pension funds are examples of these new public utilities even though they are more indirectly linked to state pension policy. The German government pursued a pension savings plan but did not specify the institution which provides it. Furthermore, membership is purely voluntary and employers are not obliged to contribute. NEST on the other hand will be organised be the state employing private asset management companies and advisers; membership is mandatory with opt-out option. Thus allocation of responsibility between the state and the market will change profoundly. Recognising the threatening perspective of returning old-age poverty, the government decided to step in thus extending its involvement in pension provision. The role of the employer is reduced from a guarantor and decision-maker to a facilitator. The question of the appropriate role allocation between the state and the market is back on the agenda. This discussion is very tentatively led in the United States focussing on the viability of state guarantees (Ghilarducci, 2008); but the OECD recognises the broader risk of a general backlash against funded private pension systems (Antolín and Stewart, 2009). We conclude that the private-public mix of pension provision is revisited.

2.5. Conclusions

The world of pension funds is in upheaval. Demographic, economic and societal changes transform the inherited pension systems. Demographic changes necessitate pension reform to restore fiscal sustainability. This rational dominated the European debate and the transition into what we term the 'New European Pension System' which is characterised by a dualism of state-based and market-based pension provision under a close web of regulation. Parallel, economic change reinforced by regulatory change

transforms private pension systems. The shift from DB to DC pension plans in the Anglo-American world and the incremental transformation of the Dutch pension system are manifestations of the powerful forces of change. These environmental changes are further accompanied by institutional changes with the potential to further change the nature and significance of DB pension funds.

We can identify two main drivers of change for DB pension funds. One is of quantitative nature as demographic and economic changes have ramifications for the future growth perspectives of DB pension funds. The second is qualitative impacting the nature of DB pension funds. First, the changed future growth perspectives of DB pension funds require changed investment and risk management practices. Size and characteristics of the pension liabilities reflect volume and structure of assets under management. Declining liabilities have a different risk profile and cash flow characteristics than growing liabilities thus setting contrarian parameters for asset allocation and risk management. It is common investment knowhow that a cash-flow positive pension fund can take greater investment risk than a cash-negative one. We have to distinguish between two types of transformation based on the type of institutional change involved. The first case is associated with a changed legal structure, the second by incremental change within an intact legal structure.

In case of a changing legal structure as we observe it in the case of the United Kingdom, where the DB pension fund is closed and a new DC plan set up instead the consequences for the DB pension world are dire: They are doomed to enter the final stage of decline. Accordingly, in the United Kingdom pension funds are starting to prepare for

the 'endgame'[48]. From the theoretical perspective of both pension investment and pension governance a continuation of the observed de-risking which we describe in chapter 1 can be expected. The finite investment horizon contradicts the traditional conceptualisation of pension funds as long-term investors which underpins the argument for equity investment. Also, the sponsor of a closed DB pension fund planning for final closure can be expected to turn risk-averse further exploiting possibilities for laying off the remaining pension fund liabilities on the market for pension risk transfer. Periods of protractedly low interest rates can dramatically aggravate the dilemmas facing pension funds and their sponsors.

In the second case of incremental changes of the plan design without changes to the legal structure the size of the pension funds will be not be impacted. Pension liabilities will be subject to the changing plan demographics but unabated from institutional change. The paradigm of the long-term investor remains intact in principle. Nevertheless, the context for investment decision-making at pension funds will be impacted as well as the changed plan design changes the risk attitude of the stakeholders.

Second, the 'New European Pension Funds' are differently positioned in the changing pension landscape. Conceptualised as integral part of state pension policy they have the political agenda to fill the pension gap opened by the retreat of the state. These pension funds are 'doomed to growth' if they are to fulfil the expectations of

[48] The challenges facing DB pension funds in their 'endgame' were outlined in a speech by David Norgrove, chairman of The Pensions Regulator in a speech at the NAPF conference on December, 7, 2010 in London. Available at: http://www.thepensionsregulator.gov.uk/doc-library/david-norgrove-napf-annual-trustee-conference-speech.aspx, [accessed 26/06/2012]

policymakers. But their social policy agenda will inform governance and risk attitude at these funds. In both cases a coherent regulatory response is needed but not yet provided.

These intersecting developments provide an interesting study on pension fund investment in the context of regulation and governance.

Appendix 2.1: Today's pension systems

This appendix provides a summary of the features of the pension systems of Germany, the Netherlands, United Kingdom and United States. We focus here on the salient features only, as it is the intention of this paragraph to contextualise the occupational pension systems - with a focus on DB pensions - in the larger context of the complete picture of retirement income, and not to explore the details of public pension provision. We provide a detailed description of the respective occupational pension systems in chapter 3. A recent more detailed overview of total pension provision in the OECD countries focussing on the public-private mix is provided by Queisser et al. (2007). The data presented here are drawn from the OECD survey 'Pensions at a Glance'[49].

The German pension system is mainly organised by the State, it is PAYG-financed and contributory. The relevance of occupational and private pensions was traditionally low. As table 2.1 shows, as recently as 2004 it was estimated that the private pension sector provided only 15 percent of retirement income, thereof 5 percent from the occupational pension system (second pillar) and 10 percent from the private pension

[49] OECD (2009). "Pensions at a Glance: Retirement-Income Systems in OECD Countries". Available at: http://www.oecd-ilibrary.org/docserver/download/fulltext/8109081e.pdf?expires=1291385994&id=0000&accname=guest&checksum=77EB7A1F8539F5B6AE6506E8B24C3688 [accessed 26/06/2012]

system (third pillar), while 85 percent was provided by the state system (first pillar) (Börsch-Supan, 2004). This has changed as a result of the 2000 Pension Reform: The OECD assumes that the private pension systems will provide a pension benefit replacing 18 percent of income, whereas the public pension system will provide a gross replacement rate of only 43 percent for all but the very high earners in the future. Overall pensioners can expect to receive pension benefits replacing 61 percent of their incomes.

The Netherlands have a universal PAYG public pension system which provides a flat pension benefit. It is financed through an earmarked tax which is nonetheless integrated into the income tax. Eligibility is linked to residency. This public pension is complemented by an important quasi-mandatory funded occupational pension system which is of DB nature covering over 90 percent of employees. Due to nearly universal coverage and substantial contributions the occupational pension system in the Netherlands provides an extraordinary high share of 40 percent of retirement income. While the public system provides for a high replacement rate of 60 percent for low income groups and a low replacement rate 20 percent for high earners, the earnings-related income replacement function of the occupational system works opposite. The retirement incomes of high earners get topped up by the occupational system. Together the systems provide a replacement rate of close to 90 percent for all earning groups. This is one of the highest replacement rates among the OECD countries.

The public pension system in the United Kingdom is a PAYG-financed two-tier-system with both a flat-rate basic pension and an earnings-related additional pension[50]. On average, workers are provided with a gross replacement rate of 33.5 percent, which is

[50] Most employees opt out of the State Second Pension into private pensions.

the lowest of all OECD countries, but this differs strongly between 51 percent for low income-workers and 16 percent for high-income worker. The high earners rely to a high degree on pensions provided from the funded private pension system which offers both DB and DC pensions. The coverage ratio of voluntary private pensions is 59 percent. Occupational pensions were traditional DB but the sector is in upheaval.

The United States publicly provides a more generous pension benefit compared to the United Kingdom with a progressive benefit formula. The average replacement ratio is 41 percent, ranging from 50 percent for low-income to 29 percent for high-income workers. The public pension is partly funded. 58 percent of employees are covered by voluntary pension plans, which replace on average an additional 40 percent of income. Pension plans are mostly linked to employment. Traditionally, employer-financed DB pension plans prevailed; the shift to DC pension plans marks the most important change in the US pension system.

Table 2.1: Source of retirement income

In percent	First pillar	Second pillar	Third pillar
Germany	85	5	10
Netherlands	50	40	10
United Kingdom	65*	25	10
United States	45	13	42

*includes SERPS
Source: Börsch-Supan (2004).

Appendix 2.2: Overview of pension reforms

We proceed this section by summarising the recent pension reforms on a country-by-country basis. We briefly touch policy reforms in both the state and the private pension system thus taking a holistic view although the regulatory reforms concerning occupational pension funds are described in more detail in chapter 3:

Germany passed major pension reforms in 2001 and 2004 thereby lowering public pension benefits from previously 70 percent of net incomes to a future level of around 40 percent (Börsch-Supan and Wilke, 2006). The pension benefits lowered in very small steps from cohort to cohort being enacted over a time span of around 30 years. So while there is nearly no change for the cohorts close to retirement, most affected is the young generation with still a long time until retirement. The changes were thus incremental but powerful. With the 2001 German Pension Reform, Germany introduced new tax-incentivised pension plans which can be used via the second or third pillar in order to close the 'pension gap' opened by reducing public pension benefits. Thus, Germany aimed at restructuring its system of providing pensions by reducing the importance of the State pension and increasing the role of funded occupational and private pensions. The debate in Germany is on the question whether the pension gaps will be successfully closed via the new supplementary pension plans (Schmähl, 2003; Börsch-Supan et al., 2008; Hurrelmann and Karch, 2010).

In the Netherlands, it is recognised that the high generosity of the pension system becomes increasingly burdensome in the light of demographic ageing and that the principle of solidarity could come under pressure (van Riehl et al., 2003). Nevertheless, no major reforms were undertaken in the public system between the mid-1990s and the

mid 2010s. Pension reform focussed on the occupational pension sector. On the regulatory side, a new framework for regulating pension funds was implemented in 2007 introducing a risk-based approach based on the fair value principle. In response to regulatory and macro-financial changes the plan design was restructured from DB to 'Collective DC' with fixed contribution and accrual rates, partly flexible benefits and pre-defined indexation rules. For more detail please see section 4.2. The Pension Accord of Spring 2010 criticised the system for two main shortcomings: the missing longevity factor and insufficient risk management. Both issues have been addressed; legislation is pending.

Also the United States expects financial problems in the public retirement programme. From 2015 onward, pension expenditure is seen to exceed the financing payroll tax with the retiring baby-boom generation; by 2037 the account of the Social Security trust fund is forecasted to be exhausted. The Social Security Trustees 2010 Report revealed that the financial problems are further aggravated by the current recession due to which the system will run a deficit already in 2010 and 2011[51]. This renders a reform of the public pension system more urgent than previously thought. Public pension reform had actually stalled in the United States (OECD, 2009). Thus public debate has not yet seriously focussed on these issues but was rather concerned with acute issues in the private pension system (Thompson, 2006). The Pension Protection Act (2006) overhauled the regulation of DB pension funds focussing on funding rules to enhance the safety of the pension promise.

[51] 'The 2010 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Fund's. 111th Congress, 2d Session, House Document 111-137, Available at: http://www.ssa.gov/oact/tr/2010/tr2010.pdf , [accessed 26/06/2012]

The United Kingdom experienced many pension reforms over the past decades. There is consent, that the public pension system is financially sustainable (Emmerson, 2003). Reforms focused in recent years on the occupational pension system: The United Kingdom implemented a new regulatory architecture for occupational pension funds in 2004, introducing pension insurance and overhauling its regulatory approach. Still, the UK pension system is believed to be in a state of crisis (Clark, 2006b). Against the twofold background of a complex state pension system not providing adequate pension benefits and the retreat of the employers from the formerly generous DB pension plans, the Pensions Commission put forward proposals for reforming both the public and private pension system in the United Kingdom. Recognising that the state should focus on the redistributive goal of pension policy providing a minimum pension for everybody the Commission nevertheless recommended that the state should transcend this basic role into also enabling people to build up the desired replacement level (Hills, 2006). At the heart of the proposals of the Commission is the establishment of a new low-cost funded system underpinned by a more generous state pension system. The first part of the proposal was endorsed by the Government: The National Employment Savings Trust (NEST) is planned to start operating in 2012. Employees will be automatically enrolled in NEST if not in an existing employer pension fund but given an opt-out option. NEST is organised and managed by the State with the contributions financed by all three parties, employees, employers and the State. It aims at providing a low-cost pension 'designed specifically to meet the needs of low-to-moderate earners and their employers'[52].

[52] NEST is basically a new pension system organised and managed by the State with the contributions financed by all three parties, employees, employers and the State. It aims at providing a low-cost pension 'designed specifically to meet the needs of low-to-moderate

Chapter 3: Managing Investment Risk in Defined Benefit Pension Funds

3.1. Introduction

Occupational pension funds operate along a simple mechanism: Contributions are paid into the fund, which are subsequently invested on the capital markets, and finally paid out in the form of pension benefits. But as the operational variables implied in this process are uncertain, this mechanism is inescapably embedded in risk. Investment returns are uncertain, and this holds true for mortality or salary trends as well. Pension funds are inevitably active risk takers. The two most important risk categories pension funds take are investment and longevity risk[53]. Unlike defined contribution (DC) pension funds, which re-distribute these risks to their participants, defined benefit (DB) pension funds, which give the employee the security of a pre-defined pension benefit, perform their task of providing safe pension benefits by assuming and retaining risk. DB pension funds can become complex risk-sharing institutions, as they may subsequently re-distribute risk between the different groups of stakeholders. The risks pension funds take need to get managed. But managing risk is not equivalent to avoiding risk. This paper argues that the risk-taking capacity is a central element of defined benefit (DB) pension funds. Moreover, this capacity is increasingly impeded by regulatory and accounting standards with longstanding detrimental effects threatening the future existence of DB pension funds.

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earners and their employers', NEST. Available at: (http://www.padeliveryauthority.org.uk/index.asp) [Accessed 26/06/2012].

[53] Operational or business risk constitutes a further risk category but is here not further taken into consideration.

Since the turn of the century pension funds have been faced with a succession of financial crises, which have at the time of this writing not abated. First, the 'perfect pension storm' between 2000 and 2003 with simultaneously falling equity and rising bond prices led to a sudden turnaround from funding surplus to deficit. Second, when pension funds had mostly successfully restored their funding levels, the onset of the Global Financial Crisis (GFC) 2007/2008 repeated and amplified the shock waves that the previous crisis had sent to pension funds throughout the world. DB pension funds plunged again into huge funding deficits. Third, the subsequent euro crisis further increased funding gaps mostly via the transmission mechanism of historically low interest rates.

The 2000 – 2003 crisis shifted attention to pension funds' risk management and served as the catalyst for calls for 'better risk management' of pension funds. The large international think tanks started to analyse pension funds' risk management. The International Monetary Fund (IMF) concluded 2004 in an analysis of 'Risk management and the pension fund industry' that 'policymakers should introduce measures to encourage better risk management practices and to reduce the risk of another cycle of over- and underfunding'[54]. The OECD conducted a first assessment of pension fund risk management in 2005 concluding that 'after several golden decades of equity investments delivering adequate returns, the topic of risk management has returned to the fore front of the pension industry given the now challenging funding and investment environment' (Stewart, 2005).

[54] IMF, Global Financial Stability Report: Market Developments and Issues, September 2004, Chapter III: Risk Management and the Pension Fund Industry, Available at: http://www.imf.org/External/Pubs/FT/GFSR/2004/02/pdf/chp3.pdf , [accessed 26/06/2012]

Risk management has stayed at the above cited fore front of the pension industry. The 'perfect pension storm' set the stage for the risk management revolution to reach the doorsteps of pension funds. Modern risk management tools analogous to those which were already used in other sectors of the financial industry such as securities firms and banks have been increasingly applied by pension funds. Nowadays, pension funds in many jurisdictions calculate Value-at-Risk (VaR), apply risk budgeting concepts and analyse fat tails[55]. Asset-Liability-Management (ALM) is routinely applied as strategic risk management tool, albeit the quality of the models and the rigour in its application still vary. But persisting funding deficits fuelled in many countries doubts about the sustainability of the pension systems and renewed the call for 'better risk management' at pension funds as the applied risk management tools did not prevent the reappearance of these funding gaps in the subsequent crisis. First, risks do not disappear when they get managed. Stakeholders still have to answer the fundamental question how much risk they are willing to take and if they are willing to bear the consequences of not taking investment risk. The rule of thumb is that one percent extra return translates into 30 percent higher pensions or 30 percent lower contributions. Second, it is questionable if the risk management approaches now being applied by DB pension funds are in all cases well suited to their needs. More fundamentally, the perception of risk appears to be currently in a state of flux. Unlike securities firms, banks or insurance companies, there is no consensus between pension funds, their sponsors, regulators and accountants on the significance of the different risk factors facing pension funds.

[55] Fat tails denote the observed phenomenon that extreme returns are underestimated by normal distribution.

The main characteristics of DB pension funds are the importance of liabilities and the long-term investment horizon. Pension funds are usually described as long-term investors. This conception provides the argument for higher investment in asset classes such as equity that are subject to higher volatility in the short-term but also reward higher returns in the long-term. As liquidity risk is usually not significant pension funds can take more market risk than short-term investors thus rendering the provision of pension more affordable.

The paradigm of the long-term investor is changing. Pension fund regulation became more risk aware and safety-focused. Shortfall risk is perceived as central risk factor threatening benefit security. Many countries have introduced pension reforms in recent years encouraging higher funding ratios, so that in a balance sheet perspective assets are sufficient to cover liabilities. As funding levels are tracked over shorter periods of time the investment horizon turned more short-term as well.

It is further argued here that the accounting standards changed the perception of risk. Economically, the pension liability is subject to longevity risk and – depending on the plan design – usually wage or inflation risk. By discounting future pension benefit payments with the yield of bonds in a market-to-market valuation interest rate risk is constructed as an important risk factor facing pension funds.

At a time when the clarion call is for 'better risk management' of pension funds, there is also a noticeable trend for pension funds in many countries to lower their risk profile. Investment strategies have generally become more risk-averse. This is not without implications for costs or benefits of pension funds, as the return on investment determines to a large extent the costs of supplying a DB pension plan. This research argues that the

shift towards lower-risk investment strategies is partly caused by the new regulatory and accounting rules. Shifting pension funds' assets into low-risk investments will ultimately lead to lower pension benefits for members.

This research focuses on the management of investment risk at single-employer DB pension funds. It describes practice and regulation of risk management at DB pension funds in the context of the development of modern risk management in the financial industry more generally. Focussing solely on DB pension funds, this paper explores into what constitutes investment risk for DB pension funds and how this risk is measured. This paper aims at answering the questions how much investment risk pension funds take and how the investment decision-making is organised under the impact of regulation and governance. Following Clark the 'term 'governance' is used to refer to the formal mechanisms by which an institution makes decisions, is held accountable to its stakeholders and beneficiaries, and acts in accordance with public and private standards' (Clark 2004). Regulation and governance therefore constitute the complete net of external and internal rules informing pension funds' decision-making. This paper analyses first pension funds' attitude towards risk as it is reflected in investment strategies and risk management concepts and tools that are currently available to and applied by DB pension funds. Second, it investigates how regulation and governance impact pension funds' investment decision-making with regard to risk-taking. This chapter summarises evidence from the four countries, which are analysed in this thesis, i.e. Germany, the Netherlands, the United Kingdom, and the United States. It is not the aim of this project to develop a best-practice investment theory or to solve the question of the appropriate level of risk-taking for pension fund, but rather to inquire how governance and regulation produces

deviations from what pension funds regard as optimal investment policy based on modern financial economic theory.

This research draws on in-depth expert interviews with pension fund managers and their consultants. These expert interviews were conducted between 2006 and 2007. The author is aware of an existing quality-bias as the interviews were in general conducted with the most sophisticated pension funds. In this regard, the findings are not necessarily representative of the overall market but the existing 'best-practice risk management'. The terms regulating and supervising authorities are used interchangeable in this article. In general, the OECD glossary of private pensions is applied with occasional recourses to nationally applied pension terms.

This chapter is organised as follows: Section 2 gives an overview on the development of modern risk management in the different sectors of the financial industry. Section 3 focuses on risk management concepts and tools at DB pension funds. The changing strategies of pension investing are explored in section 4. Section 5 concludes. In chapter 5 we give evidence of current 'best practice risk management' from four countries.

3.2. Development of risk management in the financial industry

> '*Over the past two decades, the financial world has evolved from [a] return driven to a genuine risk management industry. The term risk management certainly is not confined to what is best denoted with risk control: Measuring risks, setting limits and ensuring adherence to these limits. This is necessarily part of the whole process of risk-return optimisation …. Risk management … also compromises the decision making process of considering risk-return trade-offs and optimising stakeholders' targets …*'. (Kocken, 2006)

This section intends to give an overview on the development of risk management and its regulation at the different sectors of the financial industry. It starts with outlining a taxonomy of risk, then describes the development of modern risk management at securities firms and banks and finally the dissemination of risk management concepts to insurance companies and pension funds.

Following Kocken (2006), a broad definition of risk management is applied. Risk management is understood as a process that starts on the strategic level, first, with analysing and defining the relevant risk factors for the pension fund and its' stakeholders, second, deciding on the acceptable and desirable amount of risk to be taken, and which then continues on the operational level with the process of measuring and controlling risk. Risk is understood as something subjective, linked to the individual profile of a pension fund and its' stakeholders. This differs from the bulk of the investment-banking orientated body of literature on risk management which usually defines risk in an objective way not differentiating according to the needs of different investors or stakeholders. The conception of risk applied here comes closer to Balzer's (1994) remark that 'risk is … a relative rather than an absolute concept'.

3.2.2. Taxonomy of risk at financial institutions

Applying mostly banking terms[56], the basic risk factors relevant to financial institutions can be broadly clustered into market risk, credit risk, liquidity risk, underwriting risk, and operational risk. Market risk refers to changes in the value of an investment due to changes of market factors, such as interest rates, exchange rates or stock markets. Credit risk is defined as 'the potential that a bank borrower or counterparty will fail to meet its obligations in accordance with agreed terms'[57]. Liquidity risk is the risk that a firm is not able to settle a position at market values due to liquidity disruptions in the markets (Herring and Schuermann, 2005). The term is also used to refer to a funding crisis (Santomero, 1997). Finally, underwriting or actuarial risk refers to the risk that a financial company will be unable to fulfil their contractual obligations towards their customers. These different risk factors differ in their relevance for the different sectors of the financial industry. Their regulatory regimes differ accordingly. Market risk[58] forms the most important risk category for securities firms whereas credit risk traditionally posed the central risk for banks. Insurance companies on the other hand are faced prima facie with underwriting risk. This risk is related to the correct assessment and pricing of the insured risk, which – in the case of life insurance companies– is constituted by longevity risk. It is suggested here that basically the same holds true for DB pension funds. Furthermore, the different financial sectors are faced to different degrees with liquidity risk resulting from the different time horizon of their assets and liabilities ranging from high as for securities firms and investment banks to low in the case of life

[56] Although this terminology was also adopted by the Solvency II project which reflects the move of the European Union towards convergence of insurance and banking regulation.

[57] Bank for International Settlement, Principles for the Management of Credit Risk, Available at: http://www.bis.org/publ/bcbs54.htm, [accessed 26/06/2012]

[58] The following draws on Herring and Schuermann (2005).The more precise term as applied by the authors would be 'position risk' which combines market risk with liquidity risk.

insurance companies. As Herring pointed out ‘insurance companies are unlikely to find it necessary to incur fire-sale losses on the liquidation of their assets and exacerbate market dislocations by selling assets in markets with falling prices’. It is suggested here that this risk is even lower for pension funds. The focus of risk management systems has to adapt accordingly.

Davis and Steil (2001) point out that ‘the nature of the liabilities is the key to understanding how institutions differ in their operations’. In the banking and securities industry on the one hand, risk is in general perceived to be mainly on the active side of the balance sheet, in form of credit or market risk. On the other hand, the basic risk at insurance companies and DB pension funds is connected to the passive side. While in banking ‘risk’ usually denotes risky assets or off-balance-sheet derivatives, in the jargon of a life insurance industry, the term ‘risk’ is used to refer to a single contract on the liability side meaning a client. Whereas a bank aims at securing sufficient funding for the assets, insurance companies accumulate contributions in form of assets on the active side to secure the fulfilment of the liabilities. ‘Liabilities differ in certainty and timing’ (Davis and Steil, 2001), ranging from fixed amount and timing in the case of banks, to fixed amounts but unknown timing as for traditional life insurance contracts to unknown amounts and unknown timing in the case of DB pension funds and more complex life insurance products.

But that a liability is unknown in amount and timing does not mean that it is not predictable. Also, liabilities are, to very different extent, subject to liquidity risk. The liabilities of banks are in a legal sense fixed in amount and timing but as banks are subject of the risk of a run on the bank, they are subject to liquidity risk and can in this sense

become rather unpredictable for risk management purposes. The liabilities of life insurance companies are on the other hand less fixed and foreseeable in a legal sense but as insurance clients are less likely to delete a contract they are less subject to liquidity risk and therefore more stable. As pension contracts are in most jurisdictions not portable pension funds are the least subject to liquidity risk. The liabilities of a DB pension fund are in the long term unknown in amount and timing as the value of any single contract is subject to longevity risk and inflation risk but stable and well predictable in the short term as pension liabilities 'do not run'.

3.2.3. Development of modern risk management

Today's understanding of risk management in the financial industry is based on the pricing of risk. Even though in the aftermath of the GFC the financial industry was criticised for not correctly pricing risk[59], the fundamental methodologies of risk management have not (yet) changed. Risk management is a quantitative, computer-based process, blending the methodology developed by financial economic theory with the technology provided by the IT industry (Rosen, 2003). It is based on finance models depicting the behaviour of market variables. The theoretical foundation of quantitative risk management, as it is understood here, is closely linked to the origin of financial economic theory. It can be put down to Markowitz' publication 'Portfolio Selection' in the Journal of Finance in 1952 where he introduced the concept of the mean-variance optimisation of risk-based return as opposed to the traditional approach of return-only optimisation. Further milestones included Sharpe's (and others') development of the

[59] See e.g. Trichet, J.-C. (2009). '(Under-)pricing of risks in the financial sector, Speech delivered 19 January 2009. http://www.ecb.int/press/key/date/2009/html/sp090119.en.html, [accessed 26/06/2012]

Capital Asset Pricing Model (1964), the Black-Scholes formula on option pricing (1973), and Stephen Ross' Arbitrage Pricing Theory (1976).

Morrison and Wilhelm (2007) classify the major developments of financial economic theory in two groups: First, the portfolio-theoretical foundations were developed that allowed for the measurement of investment characteristics and performance. Second, work on relative pricing provided the framework for creating and pricing of derivative financial instruments such as options and futures. Markowitz (1952) formulated and mathematically formalised the theory of portfolio diversification through which risk can be reduced without impairing the expected return of the portfolio. Risk was turned into a mathematically measurable variable: 'Markowitz put a number on investment risk' (Bernstein, 1996). The development of the Capital Asset Pricing Model (CAPM) is mostly attributed to Sharpe (1964) and Lintner (1965). Applying Markowitz' ideas to a capital market theory, it provided professionals with the first coherent instrument of how to evaluate investments and measure investment performance. The expected return of an asset can be calculated as the sum of the risk-free asset plus the product of market wide risk aversion and the correlation of the return of this asset with the overall market return (see e.g. Mehrling, 2005). Ross' (1976) Arbitrage Pricing Theory constitutes an alternative, more general theory of asset pricing. Less restrictive in its assumptions than the CAPM, its conclusions are less specific.

The second conceptual break through was the work on derivative pricing. The Black-Scholes formula, developed by Fischer Black and Myron Scholes (1973) paved the way for the pricing of options. Based on Merton's (1973) intertemporal CAPM, the option pricing formula links the theoretically correct option price to the price of the underlying

instrument, the exercise price of the option as well as the risk-free rate, the time to expiration of the option and to volatility. Absent risk free arbitrage, the hedged position of an underlying asset and its option can be seen as risk free and its return must thus be equivalent to the return of the risk free asset. Under the 'law of one price', the replicating cash flow of a hedged position must equal the cash flow of the risk free asset, i.e. US Treasury bills. The Black-Scholes formula thus provided derivative traders in the recently opened option exchanges with a coherent valuation scheme.

Even though the 'Hall of Fame of Theoretical Finance' (Samuelson cited in Mehrling, 2005) comprises many more names, we restrict these elaborations to the CAPM and the Black-Scholes formula as they have been of overriding importance in their practical application – in spite of heavy criticism. The criticism is mostly focused on the underlying assumptions of the models. We focus here on the salient points only: Both models assume that returns are normally distributed; fat tails, kurtosis or more general, extreme risk situation as they occurred during each of the observed financial crisis are not taken into account. The CAPM assumes that asset returns are independent of each other and only correlated with the market. It is not an inter-temporal model; varying investment horizons are not taken into account. It assumes homogenous expectations, i.e. all market participants have the same expectations with regard to expected return, volatility and correlations. Markets are assumed to be perfect: frictions, taxes, transaction or information costs do not exist. All market participants have unlimited access to credit at the same interest rate. Both models are based on the 'no arbitrage' hypothesis which assumes that prices react instantly to new information so that risk-free profit taking opportunities do not exist. This list is by far not complete. But in spite of being manifold

extended and refined, tested, rejected and retested, CAPM and the Black-Scholes formula are still the backbone of asset pricing in theory and practice.

More fundamentally it is the Efficient Market Hypothesis (EMH), the underpinning dogma of major parts of modern investment theory and practice, which draws most controversy. EMH states in its basic form that markets are informationally efficient, i.e. market prices fully reflect all available information. Formulated independently by Samuelson (1965) and Fama (1965a, 1965b) in the 1960s, EMH became the dominating paradigm of the evolving financial economic theory during the 1970s. The basic framework was extended to allow for rational, risk-averse investors optimising their portfolios based on expected utility on perfect frictionless capital markets. When equilibrium prices always fully reflect all available information, market prices become unpredictable and no profits can be gained from active, information-based trading.

Large strings of literature criticised the EMH. A lot of empirical tests can be grouped into finding anomalies, regular patterns of asset returns which are in contrast to EMH and not explicable. The 'size effect' (Banz, 1981) and the 'January effect' (Keim, 1983, Roll, 1983) are just two examples. The concept of the rational investor with constant relative risk aversion became the focus of criticism from scholars of behavioural finance from the 1990s onwards. Shleifer (2000) and Shiller (2003) documented excess volatility and speculative bubbles caused by mass psychology. The psychological approach to risk-taking behaviour was pioneered by Kahneman and Tversky (1979) and started a large research on financial behaviour and financial literacy as we explained in more detail in section 2.4.2. Even though EMH has been a hotly contested theory in social science for

decades – increasingly so in the wake of the recent financial crisis – there is still no consensus in the economic literature whether financial markets are indeed efficient.

The ideas developed by academics were first applied at the desks of brokers and dealers in the starting option markets in the early 1970s and found broader application in investment banking after the stock market crash of 1973/74 and the volatile economic environment that followed over the 1970s and the beginning of the 1980s (Bernstein, 1999). The advancement of risk techniques accelerated at the beginning of the 1990s with the release of JP Morgan's RiskMetrics in 1994 which marked the beginning of the standardised use of VaR in measuring market risk (Rahl, 2000). The 'real' start of modern risk management is therefore often linked to this event. The development of modern risk management was linked to the development of capital markets, notably the option markets, so that the needs of those trading on these markets, mainly brokers/dealers and investment banks, initially informed the development of concepts and tools. Modern risk management evolved around market risks, the assets underlying these risks are tradable and valued at market prices. It takes the financial view on risk.

Risk management was not imposed on the markets by regulation but 'evolved as part of a process of adaptation to changing market conditions across national borders and regulatory regimes. But even though risk management as we know it today was not a regulatory invention, its evolution did not occur in a vacuum and was certainly shaped by regulatory events along the way' (Mengle, 2003). The 1988 Basel Accord is usually regarded as such a 'regulatory event'. It was a response of the international banking

regulators to a series of bank failures and bank crises[60]. The Basel Accord set minimum capital standards for banks based on the total of a bank's risk-weighted assets. The 1988 Basel Accord represented the first step towards a risk-based regulation of banks. It was also the first time that a financial sector was regulated subject to international standards thereby creating the 'level playing field', a geographically even competitive surrounding. But the first Basel Accord referred to credit risk only which was traditionally the most relevant risk category for banks, but was in the late 1980s neither traded nor valued at market prices.

Therefore it can be argued that it was not the first Basel Accord but the Basel Amendment 1996 which represented the first regulatory implementation of modern risk management as it referred to assets that were traded and valued at market prices applying the concepts of financial economic theory. As banks became increasingly involved in trading activities, they became increasingly exposed to market risk as well. The 1996 Basel Committee Amendment extended the risk-based regulatory approach to market risk. The release of JP Morgan's RiskMetrics in 1994 had marked the beginning of the standardised use of VaR in measuring market risk. The Basel Amendment firmly implemented VaR as risk measure in the banking industry by allowing besides the standard approach also internal models, which base the calculation of the banks' required capital for market risk on VaR. The Basel II Accord extended capital requirements to operational risk and applied all capital requirements to financial holding companies of internationally active banks. Furthermore, Basel II took a more differentiated attitude

[60] The failures of Bankhaus Herstatt in Germany and of Franklin National Bank of New York in the United States in 1974 formed the first regulatory triggers further followed by the Mexican debt crisis in 1982. For a complete list of international bank failures and crises see Goodhart and Illing (2002).

towards credit risk demanding less capital for low-risk assets and more capital for higher-risk assets[61]. At the time of this writing, Basel III is in the process of being implemented as the new capital and liquidity framework for banks. It is beyond the scope of this thesis to access the ramifications of the GFC on the practice and regulation of risk management in the banking industry and beyond.

One can conclude that the spread of risk management in the banking industry was driven by the markets' needs and the markets' crisis and later on firmly anchored in the market by regulation. On the regulatory side, risk-based supervision was introduced for the banking sector where the regulatory focus lies on preventing systemic risk.

3.2.4. Dissemination of risk management

Other financial sectors, i.e. insurance companies and pension funds were left out of this risk management revolution for a much longer time. Insurance companies are distinctly different from banks[62]. Their concept of what constitutes risk and therefore their need and technique to manage these risks differs from that of bankers. Insurance companies and banks define risk differently. Accordingly, the applied risk categories differ as well. Faced mainly with underwriting risk insurance companies traditionally took the actuarial view on risk. As outlined by Santomero et al. (1997) in a study on the financial risk management by insurance companies in the United States and abroad, insurance companies mostly classified their risks following the Society of Actuaries' risk classification taxonomy into asset risk, pricing risk, asset/liability matching risk and

[61] With the adoption of the Capital Adequacy Directive (CAD) in 1993 the European Union harmonised the regulation of banks and securities firms. Whereas other jurisdictions among them the United States regulate securities firms under a different framework focussing closer on liquidity risk.

[62] The term 'bank' is used comprising securities firms.

miscellaneous risks. This classification basically takes a balance sheet view on risks. Asset risk refers to the risk of price changes of assets comprising both credit and market risk in the banking terminology. Pricing risk refers to the risk of mispricing of the liabilities and corresponds to what was earlier described under underwriting or actuarial risk. Miscellaneous risks comprise risk factors beyond the direct influence of the insurance company. Santomero found that insurance companies were always good at managing pricing risk but that the management of financial risk posed a great challenge for them.

Starting from the late 1980s insurance companies increasingly applied ALM mainly to manage interest rate risk. Asset-Liability-Models became important risk management tools especially for life insurance companies. The reasons are to be found firstly in the changing economic environment with increasingly volatile interest rates from the late 1970s onwards. Secondly, with the bundling of insurance and saving products, the business model of life insurance companies changed from underwriting pure actuarial risk into taking also speculative market risk (Scherer, 2006). Thirdly, in many countries life insurance companies invested a higher percentage of their portfolio in equities from the 1990s onwards, thereby becoming more exposed to market risk. As the ALM models became more sophisticated integrating the financial view of risk with the traditional actuarial approach, asset and liability management systems became the strategic risk management tool at insurance companies as it combines the mean-variance efficiency analysis of assets with the precise liability constraints faced by insurance companies.

Subsequently, some countries also imposed mandatory ALM studies via regulation. But the originally banking focussed regulatory approaches are also spreading to the insurance sector and to pension funds. For example, the European Union started at the beginning of the 2000s the Solvency II process which will implement a risk-based regulatory approach for insurance companies which was adapted from the banking sector. It is still under discussion if this regulatory approach will also apply for pension funds in the European Union.

3.3. Risk management at pension funds

Pension funds lack an internationally shared taxonomy of risk. In practice, pension funds' risk management differs according to their different conceptualisation. Historically inherited, different legal structures of the pension entity as well as the pension contract - or often rather 'promise' - constitute different risk-return matrices for the stakeholders and further necessitated different interventions on behalf of policymakers. In the Anglo-American world the safety of the pension promise is based on the solvency of the underwriting employer, who alone bears the pension-related risks. Often, this risk is reinsured by pension insurance funds, usually established by state intervention. On the continent, the pension fund itself is the basic guaranteeing institution. The guarantee given by the plan sponsor could be conceptualised as a re-insurance to the pension fund. Consequently, there are no further pension insurance funds[63]. Pension funds are requested by their regulators to build up funding buffers which serve as safety net. The legal structures differ accordingly. In continental Europe, pension funds are legally independent companies, often organised on the model of a life insurance company as in

[63] The German 'Pensions-Sicherungs-Verein' insures only unfunded or partly funded pension promises but not the fully funded 'Pensionskasse'.

Germany or operated in the legal form of as endowment with mixed asset management and insurance characteristics as in the Netherlands. The Anglo-American pension fund is mostly organised as a trust. This structure secures the trust's assets but keeps it still closer to the company.

In countries, where pension funds are basically set up as a life insurance company, pension funds' risk management behaviour closely follows that of life insurance companies. The rigour with which risk management approaches are applied differs mainly with the size of the fund and the available resources. The large industry-wide Dutch pension funds were at the fore front of developing sophisticated ALM models. The Anglo-American countries traditionally took a more lenient view on risk-management at the level of the pension fund itself as it is more closely integrated into the risk management of the sponsoring company. It is beyond the scope of this paper to explore if the pension-specific risks were always especially well managed by the plan sponsor.

3.3.1. Managing risk - from 'asset only' to sophisticated ALM

Rahl describes risk management as a 'journey', as a 'lifetime's odyssey' rather than a 'one-time exercise'. Concepts and instruments have become increasingly sophisticated driven by improvements in technologies and an increased risk awareness on behalf of fiduciaries (Rahl, 2000). Traditionally, in the context of Anglo-American pension funds risk management was defined as a task of the asset allocation only (Blake, 2003). Starting at larger pension funds, modern portfolio theory concepts were increasingly used in deriving the strategic asset allocation (SAA) and managing investment risk.

Pension funds conduct efficient frontier analysis based on Markowitz' mean-variance model focussing on improving the efficiency of their investments. The shortcomings of this analysis is the focus on assets only and the short-term investment horizon (Campbell and Viceira, 2006). Tracking error which is the traditional risk measure at asset managers is also widely used by Dutch pension funds for monitoring their external investment managers. Tracking error gets also applied in a risk budgeting concept. The pension fund allocates a strategically defined risk budget in a first step among asset classes and subsequently among the single investment managers compared to the chosen benchmark. The pension fund monitors the investment manager in terms of both performance and risk taking. More recently, pension funds also calculate VaR which originates from the banking industry. In banking regulation, VaR states that the bank is 99 percent confident not to loose more than the amount of x on their trading book over the next 10 days. When RiskMetrics extended its toolset to pension funds in 2005, this period was extended to one year to meet the requirements of pension funds' longer-term investment horizon. Also the confidence interval applied is usually lower. VaR is also used embedded in a risk budgeting approach. Risk budgeting concepts were more recently developed for pension funds and have started to be implemented at large funds. Mainly since the 1990s, Asset-Liability-Management (ALM) tools have been increasingly employed by DB pension funds as integrated risk management systems. Today, the use of Asset-Liability-Management (ALM) is established market practice in all analysed countries, albeit understanding and purpose of ALM differs.

ALM provides a strategic risk management system for long-term investors who pursue objectives and have to meet liabilities (Ziemba and Mulvey, 1998). The optimal investment policy is derived in a complex system that simulates all relevant features and

constraints. ‘From its origins as an actuarial and cash flow matching technique, ALM has grown into a conceptual framework for financial management – and a professional activity in its own right’ (Boulier, 1998). Concepts and goals of ALM have changed considerably. In its beginning in the early 1970s ALM was conducted as a simple gap model analysing cash inflows and outflows and the mismatch between them. Stepwise, the risk measurement and management concepts developed by financial economic theory were implemented into the ALM models. The traditional approach to ALM, which could be termed the actuarial ALM, was deterministic in its choice of market variables. Liabilities were calculated with a fixed discount rate while market variables at due dates - current date or end of period - were used for simulating the asset side. The first ALM models implementing the current market-to-market perspective were developed in the late 1970s. While the focus of earlier ALM models was on hedging interest-rate risk, further market risk factors were by and by integrated into the models including new hedging and derivative products. ALM moved from static, deterministic to dynamic, stochastic analysis. Scenario analysis was introduced. Today, sophisticated ALM models employ economic cascade models to simulate the market variables. Also, liabilities are no longer calculated in a deterministic way but stochastically simulated.

More recently, the arrival of the fair value principle at the doorsteps of pension funds further challenges the traditionally applied risk management tools. Starting in the Dutch pension fund community, the large pension funds overhauled their ALM tools. By implementing option pricing models based on state prices, stakeholders’ risk preferences can be addressed endogenously in the ALM process. Kortleve et al. showed that the explicit consideration of risk changes the attractiveness of strategic pension policies. Thus, the fair value approach usually leads to a lower risk profile (Kortleve et al., 2006).

Ponds (2007) concludes: ’One way or another, fair-value accounting will lead to higher funding costs of pensions’.

At the same time, the focus of ALM studies changed. ALM models were used to derive the strategic asset allocation in a liability consistent framework, sometimes in a very detailed way. Increasingly, ALM is used as a strategic management information and decision-making framework which could be classified as total integrated risk management systems. The large Dutch and German pension funds use their ALM models to simulate the ‘pension deal’, i.e. to derive the key pension variables such as the rate of contribution for employers and employees or the annual increase in pension benefits, in a risk adjusted context. Accordingly, Bauer et al. (2006) from the Dutch pension research community defines ALM as a study ‘which investigates the impact of decisions with regard to investment, contribution and indexation policy on the various stakeholders of the fund (employees, employers, retired and future generations)’. In a definition coming from the United Kingdom, Blake (2003) defines ‘Asset-liability modelling as a quantitative technique used by some pension funds to structure their asset portfolio by paying due regard to the structure of their liabilities … [When it is used] to discover alternative strategies that increase the probability of meeting the fund’s objectives … this is known as asset-liability management’.

The progress of ALM was geographically uneven. Whereas Boulier states that in Europe banks are the main users of ALM with insurance companies and pension funds lagging behind, Ziemba and Mulvey (1998) remarks in an US context that banks were slow to adapt ALM. Taking a geographical view, the use of asset-liability-models seems to have been more common at continental European pension funds before it spread to the

Anglo-Saxon pension world albeit these generalisations are difficult, as the use of ALM is linked to the size of a pension fund as well as to the regulatory environment. Large-scale applications were developed during the 1990s, e.g. the Russell-Yasuda Kasai model for a Japanese insurance company (Cariño et al., 1994) or Dert's (1998) scenario-based optimisation model for pension funds.

The large Dutch pension funds have clearly been at the leading edge of employing and further developing ALM into the strategic risk management system it is today. The other end of the spectrum is represented by the US pension funds, which have been slow to take up ALM and still often have valuation periods of up to 5 years. As Ziemba and Mulvey (1998) point out, 'the most sophisticated ALM models have been developed by North-American and British researchers…but perhaps a more advanced use of such models is by the Dutch'.

These differences can be attributed to a couple of factors: First, the size of a pension fund is relevant. ALM studies are expensive, these costs are easier to shoulder for larger pension funds. With a few exceptions, ALM studies are not conducted by the pension funds themselves but by external consultants with a background traditionally in actuarial sciences. With ALM becoming more widespread in the United Kingdom – a 1990 survey by Greenwich Association cited in Blake (2003) found 30 percent of pension funds applying ALM - this raised concerns among the asset management industry in the United Kingdom that actuaries would gain inappropriate influence on the strategic asset allocation. Increasingly though, also investment banks explore into the domain of ALM albeit their competence regarding liabilities is questioned by many and conflict of interest by at the same time providing advice on the SAA and selling the products for

implementing it criticised. In the Netherlands, ALM studies are overwhelmingly – interviewees estimated 90 percent – conducted by an independent specialised consultant. Nevertheless, in addition to the direct costs of the study, pension funds also need to provide internal knowhow to understand and discuss the results of the study and to implement them properly into the internal decision-making process regarding the strategic asset allocation.

Second, the nature of the pension promise influences the attitude towards ALM – of pension funds and regulators alike. This is reflected in the attitude towards funding as ALM represents an ideal framework for managing the funding ratio. Whereas in the Anglo-Saxon world there was traditionally an attitude on benign neglect towards funding, the funding-orientated regulatory approach in continental Europe took a cohesive view on assets and liabilities. European regulators have therefore been traditionally more funding-focussed, however crude the applied methodology especially with regard to the valuation of liabilities might have been.

Third, the regulatory environment is an important factor regarding the use of ALM in a market. In the Netherlands and Germany ALM is mandatory, even in the United Kingdom with its highly critical attitude towards modelling, the use of ALM is nowadays encouraged by the regulator. Only in the United States the regulating authorities' attitude towards ALM can be described as neutral. This does not suggest that regulation took the lead in setting the market practice. It rather seems, analogue to the pattern of the evolution of risk management in general, that ALM was developed in close cooperation of academics and practitioners (see e.g. the model developed by Mulvey and

Towers-Perrin in 1996), implemented in cascades starting at the largest market players, and finally firmly anchored in the market by regulation.

In spite of their increasing sophistication, this kind of model-based risk management has always aroused criticism. Although much of the criticism may be ill founded (e.g. a presumed lack of understanding by the trustees does not disqualify the models per se), serious critics remain which are summarised here as follows: First, models are subject to 'model risk', i.e. the risk that the applied model is inappropriate, or more basically, that reality does not match the assumptions. Each financial crisis saw the breakdown of crucial model assumptions regarding e.g. correlations, volatility or the sudden emergence of not or not sufficiently included risk factors such as liquidity risk. As the application of ever more sophisticated models did not prevent financial crisis, this was often called the 'failure' of models (Scholes, 2000). Furthermore, when all financial institutions apply fairly similar models this can result in 'herding behaviour' which can lead to extreme market volatility and create what is termed liquidity black holes, which occur when liquidity in a market dries up. Regulatory authorities can further aggravate this risk by enforcing (a) the use of specified models and (b) by creating a uniform regulatory environment (Hull, 2007). Nevertheless, this criticism should not lead to refrain from modelling but rather raise the awareness in dealing with models. The merits of model-based quantitative risk management were pointed out – among others – by Fabozzi et al. (2005) by arguing that modelling is a key risk management instrument as it reduces uncertainty and improves decision-making and its use has therefore become widespread also in the pension fund community.

3.3.2. Conceptualising investment risk

Pension fund managers often feel uneasy about applying risk management tools originating from other sectors of the financial industry. One pension fund manager criticised that the existing risk management systems focus on the adequacy of investment risk relative to the paid-in capital which is central in banking regulation. But in most jurisdictions pension funds have no paid-in capital. The expressed criticism focuses further on the inadequacy of the time horizon ('Risk budgeting with VaR on the basis of one year is probably not a great thing to do for a pension fund') but also on the relevance of the applied risk categories more generally. When asked what constitutes risk for a DB pension fund, one interviewed pension fund manager defined the relevant risk as the risk to lose money, whereas the risk of fluctuations of market values was described as irrelevant for him as long-term investor. One pension fund manager stated: 'We are a friend of volatility'. Others followed along these lines. Throughout all expert interviews with pension funds, the relevance of credit risk, i.e. the risk to actually lose money, was beyond dispute, whereas the attitude towards market risk was ambiguous at best.

The main characteristics of a pension fund are the importance of liabilities and the long-term investment horizon. Pension funds are usually depicted as long-term investors which invest over a periods of thirty to forty years. Investment practice follows the adage that the exposure to equity should increase with the length of the investment horizon. This adage is implicitly built on two assumptions: First, long-term investing differs from short-term investing. Second, stock markets are mean reverting, which states that stock prices fluctuate around a long-term average path. Thus, the risk of equity declines correspondingly over time. Academic research is inconclusive. The mean variance portfolio optimisation literature built on Markowitz assumed a single period

investment horizon. Merton (1969) and Samuelson (1969) extended the time horizon to solve the continuous time problem and described the conditions under which the time horizon is irrelevant for the investment decision of risk-averse investors. These conditions include the unpredictability of returns for equally risk-averse short-term and long-term investors under the two-asset framework. Merton (1971, 1973) extended this work and developed the general framework for multi-period investing on a theoretical level. In an empirical study Campbell and Viceira (2002) developed a strategic asset allocation model for the individual long-term investor: 'Long-term investors … may judge risk very differently from short-term investors'. Taking human capital into account and assuming mean-reversion of stocks, they show that the long-term investor holds more equity and bonds than the short-term investor who invests more in cash. With time-varying real interest rates and inflation, not cash but an inflation-indexed bond is the safe asset for long-term investors. Long-term investment differs from short-term investment. Conceptualising pension funds as long-term investors underpins the fundamental argument in favour of equity investment. Siegel (1994) is one of the most popular advocates of long-term equity investment arguing that stocks are actually safer than bonds in the long run as the real returns of stocks are rather stable over long periods of time and exceed the real returns of bonds. This argument hinges first on the inflation-hedging capacity of equities, which has also been a longstanding topic of controversial debate in financial economic research, but was supported by recent studies as a valid assumption in the long-term (see section 1.2 for further detail). Second, the assumption of mean-reversion is a necessary ingredient. Even though stock returns can be highly volatile in the short term they revert to a long-term stable trend. Mean-reversion of excess stock returns turns equities into comparatively secure assets for long-term investors. The

principle of time diversification of risk lies at the core of this argument. ‘As time changes risk,…, for the true long term investors … volatility represents opportunity rather than risk’ (Bernstein, 1996).. In seminal studies Summers (1986), Poterba and Summers (1988), and Fama and French (1988) found evidence of mean reversion in the US stock market, whereas the studies of Lo and MacKinley (1988), Richardson and Stock (1989) and Balvers et al. (2000) found little or no evidence of mean reversion. The results of the so far largest sample support mean reversion in general but at largely fluctuating speed (Spierdijk et al., 2012).

This ongoing debate has important implications for DB pension funds. The arguments supporting mean-reversion imply that short-term fluctuations of asset prices do not constitute a relevant risk factor for pension funds. But there are further caveats: Bodie (1995) rejects the argument in favour of stock investment also in case of mean reversion based on option pricing theory: Even if the probability of a shortfall is smaller in the long-run than in the short run, this argument ignores the extent of a potential shortfall. Therefore the price of insuring against a shortfall increases with the length of the investment horizon. Asymmetric risks, meaning instances of falling prices without symmetric corrections, do pose a serious risk to all investors. This argument leads further into extreme value theory, which focuses on the analysis of events which occur at low probability but with large (adverse) impact (Embrechts, 2000; Taleb, 2007).

A further condition for the validity of this market-risk-irrelevance-argument is that pension funds really are the above cited ‘true long term investors’ which implies that they need not have to sell assets in falling markets, i.e. due to liquidity needs arising from their obligation to regularly pay pension benefits. This condition intuitively holds true in

the case of an ongoing pension funds with a comparatively young plan population. Immature pension funds are cash positive, which means that they are able to pay pension benefits out of their investment income. The more mature a pension fund becomes, the more cash-negative it turns. This is further aggravated if the pension fund is closed to new members. Starting from a certain point in its lifetime a pension fund needs to fulfil its pension obligation from its stock of assets. Although precise data on the projected cash flows of pension funds are not available, there is sufficient indication that this point is coming closer especially for the mature DB pension fund systems in the United Kingdom and the United States. Clark classified in an analysis of the largest pension funds in the United Kingdom 53 percent of private funds as mature or very mature defined as funds which have double or more pensioners relative to active members (Clark 2006b). And many of the S&P 500 companies [in the United States] … are rapidly approaching the day when they will begin paying out large pension cash flows on a sustained basis' (Fore 2005). Still, the nature of a pension fund's liability rules out sudden and unforeseen liquidity needs as in the short to medium term cash flows are stable and well known in advance. Meeting its obligation constitutes a cash flow matching optimisation exercise with actually little liquidity risk in the previously defined way. Albeit increasing maturity shortens the investment time horizon of pension funds thereby reducing the risk-taking capacity of the fund. This argument underpins the move towards bonds of maturing pension funds following the life-cycle investment theory.

This conceptualisation of the pension fund as long-term investor is challenged by a variety of arguments arising from an economic and regulatory / accounting background. The previous arguments take the position of the 'stand-alone' pension fund. When the pension fund is placed into the context of its sponsor further constraints arise. The

conceptualisation of a DB pension fund implies that the pension fund can come back to the sponsor in case of significant shortfalls which the sponsor will replenish subsequently. The sponsor underwrites a put option to the pension fund. The pension fund should then be seen in the context of the sponsor's risk management. To which extent the pension fund actually has to be analysed in the context of its sponsor is a highly controversial question which needs to be answered in the context of national rules and regulations. The integral view on the pension fund lies at the heart of a school in financial economics originating from the United States which argues that the pension fund itself should take no investment risk. To maximise shareholder value, the company should take risk in its core business and not in its pension fund. As Sutcliffe (2005) pointed out this theory implies, among others, that the company makes the decision at the pension funds which is not the case e.g. at British pension funds where independent trustees make the investment decision. The integral view was further challenged recently in the Netherlands based on the argument that the pension fund is in their jurisdiction also the legal owner of its assets and should therefore be seen completely separate from its sponsor.

The intermingling of pension fund and sponsoring company certainly impacts the actual investment horizon of the pension fund. Some authors argue against the long-term investor concept on the basis that the long-term investment horizons dissolve into a frequency of one-year accounting horizons when taking the point of view of the CFO (Scherer, 2006). It is beyond dispute that the sponsor's short-term accounting perspective prevails the pension fund's long-term investment perspective horizon if the sponsor is put on the market for corporate control or files for bankruptcy. In the case of mergers & acquisitions, the sponsor usually must immediately compensate potential shortfalls. The lifetime of a pension fund may exceed the lifetime of the sponsoring company. For these

reasons, the plan sponsor may wish to impose a shorter time horizon on the pension fund than plan characteristics would suggest.

The new accounting standards (for details see section 3.3.4) that prescribe how the sponsoring company has to account for the cost of DB pension funds have been strongly criticised for artificially and unnecessarily shortening pension funds' investment horizon. As they in principle integrate plan sponsor and pension fund into one accounting unit valued at market prices, the sponsors' financial statement becomes exposed to short-term market risk evaporating from its pension fund's asset investments not-withstanding the time horizon of these investments. Therefore, many plan sponsors impose second-order constraints on their pension fund such as 'avoid shortfalls in an accounting period of one year or one quarter' thereby impacting the pension fund's effective time horizon. In this case, a pension fund can retain its risk taking capacity only through funding buffers in its own balance sheet which is basically the way pension funds are operated in continental Europe – but it comes at costs. The extent to which plan sponsors can actually interfere with the boards' decision-making depends first on the specific legal environment and is thus legally embedded and nationally specified (for further detail see chapter 4 and the respective sections in chapter 5). Within these boundaries, the proposal of second-order constraints by the employer and their acceptance (or renunciation) by the board of trustees is a process of negotiation. While corporatist theory (Schmitter, 1979, Lehmbruch, 1979) gives us the theoretical framework to analyse relationships between industrial relation systems and the political sphere (Baccaro, 2003) and can thus be applied to the process of negotiating reforms of the state pension, as e.g. Baccaro (2002) theorises the Italian pension reform, the absence of both the formalised representation system and the institutionalised pattern of negotiation makes it less useful for analysing

negotiations between management and trustees. There is a broad literature on decision-making in the firm based on the seminal work of Cyert and March (1963). Negotiations between unions and companies on labour conflicts are also well researched (e.g. McKersie et al., 1965). But negotiated decision-making at pension funds is different as it lacks the involvement of unions as formalised and institutionalised representative. It is thus rather a form of semi-individualised negotiation. We are not aware of any research into the psychological and behavioural aspects of this specific aspect. The British Pensions Regulator explicitly recognises potential conflict between the plan sponsor and the trustees in negotiations and recommends 'alternative dispute resolution'[64] in case of deadlock at the bargaining table, thus introducing mediation as means of conflict resolution.

Also, regulatory authorities tend to impose regulations that shorten the investment horizon of a pension funds. This holds true for all strict rules that pension funds have to adhere to in a 'short' period of times of e.g. one year and that require immediate corrective action on behalf of the pension fund in case of non-compliance. Examples are quantitative investment rules or inflexible funding regulations. But also in countries where regulators refrained from direct interference pension funds feel, as one interviewee put it, that 'the impact of regulation and accounting has been to make people more short-termed without a doubt'.

[64] The Pensions Regulator, Code of practice 03: Funding defined benefits, http://www.thepensionsregulator.gov.uk/codes/code-funding-defined-benefits.aspx, [accessed 30/04/2013].

We can summarise that long-term investing by employer-sponsored DB pension fund is in decline. Both the BIS and the World Economic Forum[65] concluded that due to regulatory and accounting-driven constraints it is becoming more difficult for pension funds to play their traditional role as long-term investor. The cases of externally imposed restrictions which turn a pension fund into a short-term rather than long-term investor are clearly detrimental to the efficiency of the investment process and increase the costs of providing DB pensions. On the other hand, the disruption of traditional long-term financing for investment following the GFC shifted the focus of policy-makers on institutional investors, pension funds, insurance companies and mutual funds, as potentially alternative sources of long-term finance. The G20/OECD joined forces in a project on long-term financing[66].

3.3.3. Governance of risk taking

It is a well established fact that the level of investment risk pension funds take can be clustered on a national scale. Using equity exposure as the conventional albeit very basic measure of investment risk and applying this analysis to the here analysed countries, the Anglo-American pension funds have traditionally been the most active risk takers with 70 percent equity exposure in the United Kingdom and 60 percent in the United States. Continental European pension funds were less exposed to investment risk with Dutch pension funds investing around 40 percent in equity and the German 'Pensionskasse' with around 20 percent equity investment. This picture has changed

[65] BIS (2011). 'Fixed income strategies of insurance companies and pension funds'. CGFS Papers No. 44.Available at: http://www.bis.org/publ/cgfs44.pdf. World Economic Forum (2011). 'The Future of Long-Term Investing'. Available at: http://www3.weforum.org/docs/WEF_FutureLongTermInvesting_Report_2011.pdf, [accessed 26/06/2012].

[66] http://www.oecd.org/daf/fin/private-pensions/g20long-termfinancing.htm [accessed 30/04/2013].

recently as UK pension funds took the lead in de-risking their portfolios. Increasingly, employers seek to shield themselves against interest rate risk at their pension funds what is often attributed to the new accounting standards and/or regulatory approaches. This section attempts at exploring into the reasons for these differences pension funds' risk taking by analysing the different governance structures.

In all four analysed countries pension funds are set up under a fiduciary arrangement where trustees make decisions on investments. Furthermore, in all countries these arrangements are governed by fiduciary law which regulates the tasks of the trustees and the complex web of relations between the trustees and the different stakeholders of the pension fund. In addition, all countries have extensive regulations concerning the scope of allowed plan design which is routed in social and labour law. None of the countries apart from Germany openly regulates pension funds' investment apart from rules limiting the investment in the assets of the sponsoring company. Pension funds are obliged to invest in a prudent manner. This prudent person rule originates from Anglo-American trust law but has also been applied in the Netherlands for about 50 years (Maatman, 2004). But even in Germany remains the fact that German 'Pensionskasse' do not exploit their legal risk-taking limit.

Basically, the different stakeholders' attitude towards risk can be mapped as follows: The employer would be expected to encourage higher risk taking as this lowers his funding costs. His objective function can usually be described as minimising funding costs within reasonable risks which translates into the financial-economic framework of

risk-adjusted return optimisation[67]. Beneficiaries are usually depicted as more safety-focussed thus favouring lower risk investment strategies. This holds true especially for pensioners. But pension fund members can get inclined to take higher risks if the plan is contributory so that they benefit as well from lower funding costs or in case of pension plans where the benefits are linked to the investment return of the fund.

The differences in the trustees' risk attitude can be broadly clustered around the following two questions:

- Whose interests have the trustees to take into account when they decide on investment policy and investment risk?
- Who benefits from above target investment returns and who has to bear the losses resulting from below target investment returns?

The most common answer to the first question is: 'the beneficiaries'. Trustees are usually conceptualised as agents of the beneficiaries. Controversial is the legitimacy of the sponsor's interest. Prevailing market practice is often not properly legally encoded. The Netherlands is the only country of the here analysed ones which openly approves that trustees should also take the sponsor's interest into account when setting the investment policy. The pension fund is conceptualised as fiduciary of the beneficiaries and the employer thus extending the fiduciary duty to all stakeholders (Maatman, 2004). The large industry-wide pension funds in the Netherlands carefully assess the interest of all stakeholders in the annual pension deal. On the other end of the spectrum, the recent

[67] We would argue that this holds true also after the introduction of the new accounting rules (for details see section 3.3.4. Fair value accounting rather added 'avoiding shortfalls' as a second order constraint.

governance changes in the United Kingdom enacted by The Pensions Regulator aimed at strengthening the independent position of the trustees and diminishing the sponsor's influence on the investment policy. Trustees are the agents of the beneficiaries. Other jurisdictions are rather silent on this question. In the United States the trustees are constituted by representatives from the company but are legally required to act in the sole interest of the beneficiaries, what is often termed as 'wearing two hats'. The interpretation of fiduciary law rests with the Department of Labor, which has repeatedly interpreted this 'solely in the interest rule' as not precluding the consideration of other interests as long as this is not detrimental to the interests of the beneficiaries[68]. The careful interpretations indicate the difficulties inherent in fiduciary law which bears the analogy of walking a tightrope. Market practice in the United States closely aligns the interests of beneficiaries and sponsor. The same holds true for Germany. As German insurance law is silent about the decision-making of the board[69], the hierarchy of interests needs to be derived from their legal construction. 'Pensionskasse' are set up mostly as member mutual insurance companies and conceptualised as welfare institutions which both underpins the mission of the 'Pensionskasse' to improve the social welfare of its members (Dres et al., 2011). As a welfare institution, 'Pensionskasse' is further subject to German co-determination which is reflected in the equal representation of sponsor and employees in the boards. But neither is the interest of the sponsor legally denied what paves the way for a strong position of the sponsor in the actual decision-making of the pension board.

[68] See e.g the Advisory Opinion 98-04A, May 1998, on socially responsible investment, Available at: http://www.dol.gov/ebsa/programs/ori/advisory98/98-04a.htm, [accessed 26/06/2012]

[69] 'Pensionskasse' are not explicitly subject to fiduciary law as they are legally insurance companies and not trusts. We follow Löhning (2006) in his argument that insurance contracts are fiduciary contracts in principle.

Regarding the second question, it will be shown that asymmetries in the risk/reward pattern distort the neutrality of the risk attitude of the investment decision makers resulting in either too much or too little risk taking. Asymmetries can result either from the design of specific pension promise or the design of pension insurance funds and are as such politically underpinned. I will further elaborate on the nature of the pension promise and its implications in chapter 4; the treatment here is rather stylised.

Different modes of risk taking will be developed by means of stylised cases which resemble the situations in the four analysed countries. This section does not intend to argue the case of high risk-taking but attempts at explaining the different mechanisms that govern trustees' attitude towards risk taking.

Case I: Risk-taking governance structure

Under a final salary plan, the employer promises a pension benefit to the employee, which is dependent on salary and years of service. This is the traditional DB plan in both the United Kingdom and the United States. The actuary calculates the pension liability and suggests the contribution rate at which the employer funds the plan. As the pension promise is not dependent on the investment returns the employer alone bears the investment risk. When the investment returns are worse than expected, the employer has to compensate the shortfall. When the investment returns are better than expected the employer is rewarded by contribution holidays. In this case, risk and reward is symmetrically distributed[70]. The investment decisions are made by a board of trustees which is composed of representatives of the employer. The trustees are bound by

[70] This situation was criticised for its immanent cyclicality as contributions tend to increase in economically difficult times. For suggestions for change see Weller and Baker (2005).

fiduciary duty to act in the interest of the beneficiaries but can also consider the interest of the employer as long as it is not detrimental to the interests of the beneficiaries. They are also bound by the prudent expert rule to diversify the portfolio and to maximise risk-adjusted returns. Whose agents are the trustees? The argument can be made that the trustees err on the higher spectrum of possible risk taking as lower funding cost enhance the economic well-being of the employer and this also serves best the interest of the beneficiaries. Trustees can be expected to follow an active risk-adjusted return optimisation. The interests of the employer rank high.

Now add a pension insurance fund to the case: The employer can still benefit from the upside but is insured on the downside. This asymmetric distribution of risk and reward incorporates moral hazard, as has been frequently analysed and documented. In conjunction with weak bankruptcy laws it invites to strategic default and encourages an investment behaviour which can be characterised by 'gambling for resurrection', namely the increased risk-taking in a situation of crisis as one can benefit from successful 'gamble' but has got 'nothing to loose' if the 'gamble' goes wrong. This structure incentivises high risk-taking. This case is built on the US experience after the introduction of the PBGC in 1974. The moral hazard problem of pension protection arrangements is well documented (Blake et al., 2007; McCarthy and Neuberger, 2005; Bodie, 2005; Boyce and Ippolito, 2002).

Case II: Risk-averse governance structure

The employer promises under a final salary plan a pension benefit to the employee, which is dependent on salary and years of service. The actuary calculates the pension liability and sets or suggests the contribution rate at which the employer funds

the plan. The employer fully underwrites the pension risks. The investment decisions are made by independent trustees, under what could be termed a strong trustee structure. The trustees are bound by fiduciary duty to take care of the interests of the beneficiaries only. The employee perspective prevails. As plan members do not benefit from risk-taking under the here described non-contributory pension plan with fixed benefits trustees turn risk-averse. Their risk-taking is beneficial to the employer only as it lowers the pension costs but detrimental to the beneficiaries as it deteriorates the employer's covenant and thus the safety of the pension benefits. This governance structure is basically risk-averse.

The risk averseness of the trustees could be expected to be overcome by introducing a pension insurance fund. But as pension insurance funds usually cap pension benefits members are always worse off in case of the sponsor's bankruptcy.

This case resembles the situation in the United Kingdom after the implementation of the Pensions Act 2004 and subsequent regulations.

Case III: Risk-neutral governance structure

Employer and employee contribute under an average pension a fixed percentage of the employees' salary to a pension fund. The guaranteed pension covers only the sum of the paid in contributions. Investment risk is thus shared between employer and employee. The employee benefits twofold from good investment returns as firstly the contribution rate is lowered and secondly the pension benefits are indexed in line with inflation. In case of insufficient investment returns indexation is suspended and/or contributions increased. The employer still underwrites the shortfall risk, but can also benefit from strong investment returns as investment returns which exceed what is

required for indexation can be recovered in form of lower contributions. The surplus can be withdrawn for the benefit of the employer. The investment decision is taken by trustees, equally representing employees and employers, who have to consider the interests of all stakeholders including the sponsoring company. As risks and rewards are symmetrically distributed, the risk attitude is not distorted. Interests of employer and employee are well balanced. This is a brief description of the situation in the Netherlands.

Case 4: Risk-diffuse governance structure

Let us assume a case, where the employer promises a future pension which depends on contributions, which are fixed in absolute terms, and the years of service. The pension benefit is projected based on actuarial assumptions. It consists of a minimum benefit guaranteed by the employer and an additional benefit subject to higher then calculated investment returns. The investment decision is made by the employer. The employer fully underwrites the shortfall risk but can also recover the surplus, so that the employer's risk profile is still mainly neutral[71].

In a second case the employer offers the employee the possibility to convert part of her salary into a future pension. The pension benefit is projected based on actuarial assumptions. It is not guaranteed but depends on the investment returns. The difference to a pure DC plan is that the employer guarantees a minimum return on the paid-in contributions. The investment decisions are made by the employer. The employee benefits from higher than expected investment returns and is shielded from the downside, whereas the employer has the risk of extra contributions in case of adverse investment results but cannot reap the upside. The employer is strongly discouraged from risk taking

[71] Apart from the reward for the guarantee the employer has written.

and can be expected to implement a low-risk investment strategy. These two cases resemble different pension plan design common in Germany.

These stylised cases might help to explain differences and changes in the risk attitude although they are certainly not sufficient. The offered theory is consistent with the low risk profile of German pension funds as well the recent de-risking of UK pension funds as the situation in the United Kingdom moved from case 1 to case 2. It certainly does not explain the traditionally higher risk-taking of pension funds in the United Kingdom compared to those in the United States as the long standing existence of a pension insurance fund in the United States would have suggested the opposite. Regarding the significantly lower equity investment by the Dutch pension funds, one could suggest that the equal participation of employers and employees in the bearing of risk and the decision-making on the taking of risk tends to lower the risk profile.

3.3.4. Measuring risk – from the actuarial valuation to fair value

> '*The strong influence of accounting on behaviour highlights the need to narrow the gap between accounting and economic reality. In an ideal world, there would be no tension between accounting, underlying economic realities and sound risk management.*' (Borio and Kostas, 2005)

The valuation of pension funds changed fundamentally over the last 10 years. The accounting profession took the lead in changing the logic of pension accounting thus revoking the traditional consensus between actuaries, regulators and accountants regarding the valuation of pension funds. A new consensus is in most countries not yet reached.

The valuation of pension funds is the task of the actuary who analysis assets, liabilities and funding status, advises on the necessary contribution and certifies

compliance with the regulatory rules[72]. The actuarial valuation is usually commissioned by the trustees who pass it on to the sponsor, the beneficiaries and to the regulator. Most countries have a certain set of rules for conducting the actuarial valuation which can take the form of guidance notes by the professional association, e.g. in the United Kingdom, or the form of legally encoded regulations as in the other here analysed countries to varying extent. It is noteworthy that as all countries practice different actuarial assumptions e.g. with regards to mortality tables or discount rates, the present value of what could be defined as one unit of pension promise differs widely.

The actuarial valuation can be characterised as taking the perspective of the pension fund. The accounting rules prescribe how the plan sponsor has to account for the cost of providing DB pension plans in its own balance sheet. Traditionally those two professions and the regulators took a similar look on pension funds.

The standard actuarial valuation is usually conducted on an ongoing basis focussing on accrued rather than projected liabilities. It takes a forecasting view on the pension fund judging whether the pension fund will be able to fulfil its accrued obligation given its current assets and investment strategy, and what level of contribution from the sponsor is necessary to reach this goal. The assumptions regarding the main risk factors surrounding the value of the pension promise mainly mortality and – if applicable - inflation as well as the assumptions in deriving the present value of future liabilities are the key variables in the actuarial valuation. Each country usually applies a standardised mortality table which may be adapted to the specific characteristics of the plan population

[72] For an analysis of the role of the pension actuary in the countries of the European Union, see 'Professional Responsibilities of Pensions Actuaries', Groupe Consultatife Actuariel Europeen, 2005, Available at: http://www.gcactuaries.org/documents/prof_resp_pens_jun05.pdf, [accessed 26/06/2012]

and which is either prescribed by regulation or recommended by the professional bodies. Mortality tables differ widely[73]. The same holds true for the chosen discount factors. Anglo-American pension funds discounted liabilities with the long-term expected return on assets, which would be derived from the asset portfolio mix. Other jurisdictions applied nominal or book values for the assets and used a fixed discount rate for the liabilities thereby approximating the expected portfolio return. In continental Europe the actuarial valuations were conducted yearly whereas triennial valuations dominated in the Anglo-American countries.

The old accounting rules recognised actual or averaged contribution to the pension fund derived by the actuaries as pension cost in the sponsors' financial statement. The traditional accounting rules are therefore usually described as the actuarial model as they followed the actuarial best estimates. The traditional actuarial approach focused on the funding requirements to meet the obligations of pension contributions but neglected the financial status of the pension fund (Whittington, 2006).

None of the traditional approaches applied marked-to-market valuations to pension funds. In this world, the corporate sponsor of a pension fund was largely shielded from market risk in the pension fund. One might suggest that balance-sheet risk, namely the risk of unplanned deficits in the sponsor's balance sheet triggered by financial market

[73] 2006, Cass Business School conducted a detailed study on the different mortality tables applied by the countries of the European Union, Canada and the United States, 'Mortality research project - Mortality assumptions used in the calculation of company pension liabilities in the EU', Available at: http://www.gcactuaries.org/documents/mortality_project_report.pdf. The study was updated in 2011 and found persisting differences between national mortality tables that were not justified by the underlying data on population mortality or plan population. 'Second international comparative study of mortality tables for pension fund retirees: A discussion paper'. Available at: http://www.gcactuaries.org/documents/mortality_project_report.pdf, [accessed 26/06/2012]

volatility, did not constitute a relevant risk category for corporate sponsors. But due to the often extensive smoothing and the long intervals between valuations also at the level of the pension fund market risk was not measured. As one market participant put it: 'In the old actuarial valuation we could trust that any deficit would just vanish.'

This traditional actuarial approach was heavily criticised for its lack of transparency, as actuarial values were constructed rather than putting the spotlight on current market values (Exley et al., 1997). Principles for evaluating pension provisions in the economic world of the plan sponsor taking a financial economic rather than an actuarial view were developed in an US context from the late 1970s onwards. The first paper was by Sharpe 'Corporate pension funding policy' in 1976. The theories were transferred into accounting and applied in an UK context by Exley, Mehta and Smith in a paper 'The Financial Theory of Defined Benefit Pension Schemes' presented in 1997 to the Institute of Actuaries. Basically, market prices are applied to pension assets and liabilities. Based on the assumptions of complete markets and contracts the pension liability is constructed as a bond and discounted with the yield of a bond with matching duration. Furthermore, this school of financial economics takes an integral view on pension fund and plan sponsor and concludes that the plan sponsors' investment risk taking in its pension fund is detrimental to the goal of optimising shareholder value.

This new approach to accounting is known as 'balance sheet' approach as it focuses not on the long-term funding requirements for meeting the DB pension promise but on the current financial situation of the pension fund. This approach calculates the pension fund's surplus or deficit as difference between the current values of the pension

fund's assets and liabilities, which has to be included in the sponsor's financial statement (Whittington, 2006).

Starting out from the United States pension accounting standards are converging internationally (Fore, 2005). The US standard FAS 87 introduced in 1986 was the first accounting standard following the 'balance sheet' approach. Assets are valued at market prices and pension fund's liabilities discounted at a long-term interest rate. Surplus or deficit is recognised in the sponsor's financial statement. But FAS 87 applied a smoothing methodology to alleviate annual fluctuations of pension fund's assets and liabilities and commented on the plan's surplus or deficit in the footnotes only. The following accounting standards stepwise abolished the smoothing mechanisms and extended the recognition of surplus or deficit in the plan sponsor's financial statement thus increasingly exposing plan sponsors to short-term fluctuations of market prices. The international standard IAS 19 eliminated the smoothing of asset prices but still kept some smoothing option for liabilities. Companies may delay the recognition of parts of the pension liability as long as it does not exceed specified threshold ('corridor approach'). In principle, surplus or deficit must be recognised in the sponsor's balance sheet. The UK's FRS 17 completely eliminated smoothing but requested sponsor's to report surplus or deficit in a separate statement and not directly on the balance sheet. More recently, FASB started reforming the US standards in a similar way. Furthermore, starting with FAS 87, the accounting standards focussed on projected rather than accrued benefits. The revised version of IAS 19, which will be introduced in 2013, abolishes the 'corridor' and requests immediate recognition on the balance sheet. As thus the pension liability increased and turned volatile, the plan sponsor's world changed dramatically. Balance-sheet risk became a relevant risk category for corporate pension fund sponsors.

This move by the accounting standard setting bodies breached the uniformity of the methodology of measuring values and risks: The UK pension funds mostly still apply the actuarial approach for their own accounting but have to provide fair valuations to their sponsors. The same applies to German pension funds whose accounting system, which is prescribed by the regulatory authority, is rooted in book valuation, whereas the corporate sponsor usually has to apply IFRS accounting at fair values. The Dutch Central Bank took the lead among the pension fund supervising authorities in implementing the fair value principle also in the new regulatory framework. The recent reforms in the United States point into a similar direction. But there still remains the difference that regulators focus on accrued benefits whereas corporate sponsors have to account for the projected benefit obligation which is usually significantly larger.

Pension funds and their sponsors have to cope with the fact that different values are put on their pension plan. As was shown in a previous study sponsored by the OECD, the liability resulting from one identical pension plan differs in absolute amount and behaviour under the different jurisdictions and valuations. Following the old adage that 'we manage what we measure' the application of various valuation methodologies creates a dilemma for risk management as the management objective becomes ambiguous. In these cases, a hierarchy of values is required but not supplied (Blome et al., 2007).

The introduction of the new accounting standards coincided with the perfect pension storm thus exposing often large funding gaps at the pension funds. Whereas the traditional approach to accounting was criticised mainly for its lack of transparency, critics of the new approach argued that by 'reporting short-term fluctuations in the estimate of a long-term liability, it was introducing spurious fluctuations into the

accounting reports which might give a misleading picture of a company's performance and financial state' (Whittington, 2006). In a comprehensive review of pension accounting, Glaum (2009) concedes that 'pension accounting has caused controversies' from the beginning, which is caused by heterogeneity of the economic and legal nature by pension promises, the changing regulatory approaches to pension funds as well a the long-term nature of the pension liability and its sensibility to changes in the underlying actuarial assumptions. We will further elaborate on the changing nature of the pension promise in chapter 4 and merely refer to Napier (2009) who points out that the change from the gratuity theory to the deferred pay approach was reflected in the pension accountants changing from 'expense-as-you-pay' accounting to the balance sheet approach. The impact of the change of the accounting rules is controversial. Klumpes and Whittington (2003) showed that the introduction of FRS 17, which – unlike the old IAS 19 – demands immediate recognition of actuarial gains and losses, triggered the closure of DB pension funds in the UK. Boeri et al. (2006) state that the new accounting standards eroded the risk taking capacity of the plan sponsor. In a literature review of existing studies, Kiosse and Peasnell (2009) conclude that while changes in accounting have impacted the allocation of plan assets, cost-cutting motives were the prevailing motif for closing down pension funds.

In practice, problems arise with the application of market prices to pension funds' assets and liabilities. As the majority of pension fund's assets are usually tradable in liquid markets market prices are easily available. The valuation of illiquid and not-traded assets such as private equity, hedge funds and, most recently, structured bond products such as CDOs is more problematic. Challenging is the construction of fair values to pension liabilities as a market for pension liabilities does not exist. This gap is bridged by

constructing the cash flow arising from pension fund's liabilities as bond-like thus – applying the Law of One Price - discounting the liabilities with a long-term interest rate theoretically the zero-coupon structure of Government bonds or – less sophisticated – as a long-term interest rate with fixed maturity, usually the yield of high quality corporate bonds. De Jong showed that it is not possible to value pension liabilities in incomplete markets as they exist in the real world (de Jong, 2005). Although, mathematical iterations can be found to cope with the challenges, the valuation of pension liabilities remains in a certain way constructed. Orszag and Sand (2006) critically summarise the theories developed by corporate finance on pension concluding that 'as yet, modern finance theory does not provide and answer to ... the most fundamental question in pension finance how much to fund pensions and how to invest'.

In practice, the perceived risk profile of the pension liability changed. As the classical final salary pension promise links benefits to years of service and final salary, the main economic risk factors surrounding the liability are longevity risk and - depending on the plan rules - wage or inflation risk. The fair value approach calculates the present value of the pension liability by discounting the cash flows with the yield of bonds which are subject mainly to interest-rate risk. As the focus shifted to the equivalence of the present value of assets and liabilities rather than their future cash flows, fluctuations of the liabilities due to interest-rate changes became a further focus of risk management. Interest-rate risk was turned into an important risk category facing pension funds. Thereby, the accounting standards changed the perception of risk. Focussing on the balance sheet further shortened the investment horizon from the perspective of the plan sponsor undermining the conceptualisation of the pension fund as long-term investor. We can therefore identify accounting as a further factor impacting

investment strategies besides governance – as we outlined in the previous section – and regulation, as we will detail in the next section.

3.3.5. Regulating risk management

Pension fund regulation forms a further factor determining risk taking. The investment process is embedded in the distinct regulatory framework. The regulatory environment is a key determinant for pension fund management (Fabozzi et al., 2005).

Today's mantra of pension fund regulators is usually the protection of member's benefits. In economic terms, the rationale for regulating pension funds is consumer protection based on asymmetric information and the principal –agent problems, which is basically the same as for regulating insurance companies. Unlike insurance companies, pension funds are usually not in the pro-profit business. Maximising shareholder value is not a valid business proposition for pension funds. Unlike insurance companies, pension funds have – at least in principal – a sponsor as guarantor and protector. There is consensus that, opposite banks, pension funds do not pose a systemic risk. Nor is there the need to protect against monopolies. Regulation of pension funds is still conducted mainly on a national scale. The European Union (EU) introduced the first supranational regulation of pension funds in June 2003 with the directive on 'the activities and supervision of institutions for occupational retirement provision'[74]. This directive allowed cross-border provision of occupational pensions but apart from formulating some rather broad regulatory principles, regulation remained mainly with the national regulatory agencies.

[74] DIRECTIVE 2003/41/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 3 June 2003 on the activities and supervision of institutions for occupational retirement provision.

As the ultimate goal of pension regulation is formulated as the protection of members' benefits, safety aspects rank high in all jurisdictions. But there remains the efficiency argument: Employing pension contributions in an efficient way is not only in the interest of Governments aiming at minimising tax subsidies but even more so in the interest of employers and employees aiming at minimising the cost for providing a defined benefit or maximising the benefits from a given contribution. Investment is a core function of pension funds (Davis and Steil, 2001). As the investment return on pension funds' assets determines the costs of providing a defined-benefit pension plan, the efficiency argument requires efficiency of the investment process. The European Union states in the preamble to the pension fund directive that 'the investment policy of an institution is a decisive factor for both security and affordability of occupational pensions'. Security and affordability can be seen as constituting the two main goals in pension regulation. Pension fund regulators recognise the risk-return trade off which is inherent in the pension fund system, but regulators' attitude towards risk differs. Anglo-American regulators were traditionally more lenient on pension funds' risk-taking than their continental European counterparts. It was argued that these differences in the approach to pension fund regulation mirror the differences in the conceptualisation of pension fund systems (Laboul and Yermo, 2006).

Regulation of the asset investment of pension funds and funding rules were identified as the two areas of pension fund regulation which are most relevant to the investment and risk management process (Blome et al., 2007). Regulation of the asset investment of pension funds is generally classified along two broad concepts: The prudent person principle as the qualitative regulatory principle requiring diversification of assets and the limit setting of the quantitative regulatory approach. The prudent person

principle is deeply embedded in the principle of fiduciary duty which forms a fundamental aspect of the Anglo-American regulatory approach. Fiduciaries are required to act with prudence. Although the United Kingdom and the United States share these basic principles, the understanding of what constitutes prudent investment differs. Under UK law trustees are not requested to have professional investment knowledge but only to 'obtain proper advice about it'. This rule paved the way for the huge influence of investment consultants in the United Kingdom. In the United States the prudent person rule was over time further developed into the prudent expert rule. A pension fund manager's decisions are compared to those of investment professionals. In the United States, prudence is interpreted along the lines of financial-economics, i.e. maximising risk-adjusted returns. This is consistent with the traditional focus on affordability in US pension regulation. Prudent investment requires a well diversified portfolio. It seems doubtful if the heavily bond-geared portfolios of some continental European pension funds would pass the prudence test in the United States.

Quantitative investment regulations were wide-spread in continental Europe. The way they are usually applied, quantitative investment restrictions reflect a clear focus on safety forfeiting affordability. They were increasingly criticised for producing suboptimal investment results and – following the wave of liberalisation of financial markets in the 1990s – mostly abolished. A general case against quantitative investment rules for pension funds was made in a report commissioned by the European Commission what became known as the 'Pragma-Report'. Quantitative investment restrictions were criticised for being 'in the way of optimisation of the asset allocation and securities

selection processes and, therefore, may lead to sub-optimal return and risk taking'[75]. The different types of portfolio regulations and their impact of pension funds and life insurance companies were examined in more detail 2001 by Davies in a research commissioned by the OECD concluding that 'the key points for policy purposes are that prudent person rules are generally preferable to quantitative restrictions for pension funds'. A quantitative approach investigating the impact of regulatory rules on investment and risk management of pension funds in selected OECD countries was taken 2007 in a further OECD project (Blome et al., 2007). The results of this project further emphasises Davies' policy recommendation that 'appropriate strategies of deregulation will thus … (contain) an early introduction of prudent person regulation'. In general, there is a trend towards 'increasing convergence toward some form of "prudent person" rule in investment regulations and away from quantitative restrictions' (Laboul and Yermo, 2006).

The sometimes rigid rules of continental regulators were often criticised for allowing too little flexibility and thus imposing too high costs on pension funds, but in times of crises they prevented pension funds on the continent from plunging into deficits comparable to those suffered by their Anglo-American counterparts. The Anglo-American regulatory approach on the other hand was considered as not providing adequate safety to beneficiaries. The focus shifted from affordability towards safety. Both the United Kingdom (The Pensions Act, 2004) and the United States (Pension Protection Act, 2006) imposed pension reforms in recent years requesting higher funding ratios as

[75] European Commission, 1999, 'Rebuilding pensions, security, efficiency, affordability - recommendations for a code of best practice for Second Pillar Pension Funds,' prepared by Pragma Consulting for DG-XV, European Commission, Brussels, Available at: http://ec.europa.eu/internal_market/pensions/docs/studies/1999-occupa-full_en.pdf, [accessed 26/06/2012]

additional safety measures in addition to existing – as in the United States – or newly established – as in the United Kingdom – pension insurance funds. Although the need for action was considerably lower on the continent in terms of crisis management, the Netherlands completely overhauled its regulatory regime and introduced a risk-based supervision by implementing a model-based approach similar to those used in international banking and EU insurance regulation[76].

Regulation became more risk aware and safety-focused demanding higher funding levels and often encouraging pension funds to lower the risk profile of their portfolios. As a general trend, policy makers focus much closer on the funding of pension funds. Shortfall risk is perceived as central risk factor threatening benefit security. Many countries have introduced pension reforms in recent years encouraging higher funding ratios, so that in a balance sheet perspective assets are sufficient to cover liabilities. Solvency became the core regulatory instrument. Whereas this approach is consistent with the general concept of pension funds as stand-alone companies in continental Europe it is questionable in the Anglo-American world where the safety of the pension promise is mostly based on the sponsor's covenant. Regulation in the United Kingdom has started to take the sponsor's covenant into consideration; the United States strengthened the funding rules instead.

The regulatory tools employed to steer the funding ratio differ distinctively. In continental Europe regulation is rule-based. Continental Europe in general exercises precise, quantitative rules that apply to all pension funds in the same way, although increasingly taking the individual risk profile of pension funds into account. The German

[76] There is ongoing debate at the EU level if the Solvency II regulations for insurance companies should also be applied to pension funds.

funding rules are the strictest as they do not provide recovery periods in case of underfunding. The Netherlands introduced a risk-based approach based on the fair value principle analogue to banking regulation. They concede specified recovery periods. As indexation is in nearly all pension plans conditional, pension funds do not need to fund for it. The United Kingdom adopted a principle-based approach explicitly dismissing quantitative rules given the negative experience with the Minimum Funding Rule (see section 5.3.5.). Regulation is focussed on enabling the trustees to operate the pension funds prudently but following a scheme-specific approach. Accordingly, there are no precise rules regarding recovery plans or periods in case of underfunding. Regulation of pension funds' governance can be seen as a fundamental aspect of this approach. As the United States share the fiduciary law tradition, regulating governance forms a key aspect also of US pension fund regulation. Albeit with regard to funding regulation, the United States underpinned moral principles with quantitative rules. US funding rules compose a massive and powerful piece of regulation.

In the pension literature the goal of a pension fund is usually described as paying benefits to members. Only rarely is 'funding the pension benefits' constructed as a primary goal in its own right. We share the majority view that it is the ultimate goal of a pension fund to pay the promised pensions to the beneficiaries. A pension fund which is 'fully funded' over its life cycle ensures that the promised benefits can be paid even in case of bankruptcy of the plan sponsor. In this view, 'funding' becomes an intermediary target, which could also be conceptualised as an instrument of risk management imposed by the regulating authorities on pension funds.

Recent experience in the United Kingdom and the United States highlights the difficulties surrounding the concept of 'funding'. The first caveat relates to the difficulty to define 'full funding'. Pension assets are usually easy to evaluate as they are mostly traded on liquid markets were prices are available. Pension liabilities on the other hand tend to be uncertain, which holds true especially under an Anglo-American DB pension promise, as neither salary nor mortality trends are known variables. As was shown in section 3.3.2., financial economic theory does up to now not provide a theoretically coercive and unambiguous valuation methodology. As all countries apply different funding concepts, national funding ratios are not compatible on an international scale. For example, the valuation concepts applied in the United Kingdom include indexation of benefits (which is legally required in the UK), whereas the funding concept used in the Netherlands does not (as indexation is voluntarily, but aspired). When comparing funding figures internationally, as a rule of thumb a funding level of 100 percent stated in the UK would be roughly equivalent to a funding level of 120 percent as disclosed in the Netherlands. General acceptance of valuation methods therefore rests on stakeholders' consent. Whereas in Germany and the Netherlands the interpretation of funding which is formulated by the regulating authority is in general accepted by the pension fund community, this does not seem to be the case in the Anglo-American countries. The concept of funding seems to be a highly controversial and partly contested area.

In general, the focus of Anglo-American pension fund regulation shifted from affordability towards security. In spite of the inherent problems surrounding this concept, solvency turned into the shared intermediate target of regulation. By increasingly applying market rates in assessing the adequacy of solvency levels regulation turned more short-term.

3.4. The changing paradigm of pension investing

> '*The goal of defined benefit pension plan investment management is to systematically fund the future cash flows of pension benefit obligations'* (McGill et al., 2010).

Traditionally, pension investment was conducted in as asset-only context. But as the importance of the liabilities for investment strategies was increasingly recognised and regulatory policy tightened, today's pension investment represents a long-term optimisation exercise under the constraints of regulatory and accounting rules and often further management objectives. Especially the funding focus of regulation impacts the strategic goals of investment.

Whereas in the United States pension fund investment is still often focussed on optimising risk-adjusted returns, throughout Europe, pension funds have become more funding orientated often extending the duration of their bond investments. According to a Dutch interviewee 'the investment policy is turned to the goal of maintaining a certain solvency level in the fund'. A British pension fund manager commented: 'The main concern is that the deficit grows again'. Albeit the regulatory constraints became tighter and pension fund managers' complaint over too much regulation is common over all countries, German pension fund managers were the only ones who stated that their portfolio would be very different in the absence of regulation.

In the traditional world, investment was mainly an exercise in optimising risk-adjusted returns conducted by the pension fund manager with often a rather loose view on liabilities. In the new world, investment resembles an optimisation exercise under multiple, often conflicting constraints formulated by different stakeholders. The 'perfect pension storm' at the turn of the century with simultaneously falling equity prices and

bond yields challenged the wisdom of the conventional investment strategies and risk management techniques of pension funds (Ambachtsheer, 2005). Especially the traditional balanced mandate with a 60:40 portfolio mix of equities and bonds[77] which was the dominating investment strategy in the Anglo-American countries was criticised for exposing pension funds to considerable funding gaps. In continental Europe where pension funds' equity investment had traditionally been significantly lower at 40 percent in the Netherlands and around 20 percent in Germany, the blow from the 'perfect pension storm' was less devastating but still damaging. Globally, pension funds were criticised for taking too much investment risk.

Since then, pension funds' investment strategies have in general become more risk-focused. Investment strategies moved from statistic to dynamic and from balanced to core-satellite. Pension funds portfolios are increasingly diversified over asset classes and regions. The investment in alternative asset classes has increased in all countries. Especially Anglo-American pension funds invest increasingly internationally. At the same time, the risk focus of pension funds' investment strategies has changed. With the changing regulation and accounting rules as well as the maturing of pension funds, liabilities became more important for the formulation of the investment strategy. In accordance with the changing perception of risk, risk management became much closer focused on managing shortfall risk and to hedge interest rate risk, which is in many cases seen as the most significant risk pension funds face. This change can be seen as triggered by regulation and accounting. Especially the change in the measured risk profile of DB pension funds' liabilities profoundly impacted pursued investment strategies as

[77] In the UK the mix was closer to 70:30 (Blake, 2003).

investment policies follow the changing perception and management of risk of those involved in investment-decision making.

In continental Europe where pension funds had to follow stricter funding rules the investment policy has always been stronger influenced by the prevailing valuation method of the liabilities. Discounting liabilities with a fixed discount rate as in Germany encourages the use of absolute return strategies where the aspired return is constituted by the discount rate plus x. German 'Pensionskasse' frequently aim at enhancing yield by buying into structured products. Discounting liabilities with the term structure of current bond yields as in the Netherlands triggered the implementation of interest-rate hedges while staying in their 40 percent equity and 40 percent bonds strategic asset allocation.

But pension funds became not only more risk-focused; pension funds de-risked noticeably. The following table broadly illustrates the development of pension funds' asset allocation since the turn of the century.

Table 3.1: Pension fund asset allocation for selected investment categories in percent of total assets

	Germany				Netherlands				United Kingdom				United States			
Year	Shares	Bills & bonds	Cash & deposit	Other	Shares	Bills & bonds	Cash & deposit	Other	Shares	Bills & bonds	Cash & deposit	Other	Shares	Bills & bonds	Cash & deposit	Other
2001	39.1	31.3	1.6	28.0	47.0	36.0	0.0	15.0	59.5	24.0	2.6	13.0	53.0	25.9	1.0	19.0
2002	36.7	31.4	2.3	29.6	37.0	43.0	2.0	16.6	53.0	29.0	2.0	14.0	50.7	27.0	1.3	20.0
2003	34.9	27.5	2.5	35.1	44.6	39.0	2.0	13.0	51.0	29.0	2.0	16.0	55.0	25.0	1.1	18.0
2004	32.2	29.0	2.6	36.1	44.0	41.0	2.0	11.0	49.0	29.0	2.0	19.0	56.0	24.0	1.0	17.0
2005	34.6	30.8	2.6	32.0	46.2	40.8	2.3	10.0	49.4	28.7	2.2	19.8	57.0	25.0	1.0	16.0
2006	34.0	31.6	2.6	31.8	46.0	39.0	4.0	9.0	46.9	29.0	2.5	21.0	57.0	26.0	0.9	15.0
2007	10.1	37.5	2.3	50.1	40.0	35.0	3.9	20.0	41.0	33.6	2.9	22.0	56.0	27.1	1.0	15.0
2008	6.1	38.3	5.3	50.3	37.0	37.5	4.8	20.5	37.0	35.0	2.0	24.0	46.1	29.0	1.8	23.2
2009	6.1	40.8	3.3	49.9	32.0	46.5	3.6	17.0	37.0	35.0	3.0	24.7	45.4	31.4	2.0	20.9
2010	5.2	41.9	3.1	49.8	19.5	56.2	4.0	19.8	36.4	34.0	2.0	26.0	49.3	25.6	1.5	23.6
2011	3.7	40.9	2.3	53.1	33.5	42.1	2.0	22.1	31.0	35.0	2.0	31.0	48.1	26.0	1.4	24.5

Source: OECD Global Pension Statistics[78]

[78] Methodology: The data are from the OECD GPS online database. When the look-through on mutual funds was not provided, we assumed a 50:50 split shares to bonds. The data 2008-2011

Especially in the United Kingdom, the asset allocation to equity declined significantly while the allocation to bonds and also alternative asset classes rose. As interest-rate risk is now often perceived as the main risk pension funds face in managing the funding level, Liability-Driven-Investment (LDI) strategies became popular around 2005. Although its theoretical foundations date back to the 1950s (Fabozzi, 2007) practical applications were more recently offered by investment banks in the United Kingdom in the early 2000s. According to a recent survey from Mercer[79], 15 percent of survey respondents in Europe declared themselves as being LDI investors with many more restructuring their portfolio along LDI lines. Investment trends are similar in the United States, but with regards to de-risking US pension funds are lagging their European peers.

The goal of LDI approaches is to manage surplus risk. As interest rate risk is regarded as an important but unrewarded risk factor, the focus is usually on interest rate risk, often also inflation risk. As in ALM more generally, liabilities are taken as the benchmark for the asset allocation, but whereas ALM represents just the framework for a consistent picture of assets and liabilities, LDI strategies implement investment portfolios which aim at matching the characteristics and behaviour of the liabilities thus eliminating or at least reducing risk. There are two main concepts for LDI:

- Immunisation strategies match the duration of the assets and liabilities ('partial immunisation').

for Germany, Netherlands and United States are from 'Pension Markets in Focus', OECD, where the split in the investment categories was already provided by the OECD. We refer to the GPS database for further detail. Germany changed the reporting methodology in 2007. The high value of the category 'other' is mainly driven by loans and other mutual funds.

[79] Mercer. Asset Allocation Survey: European Institutional Marketplace Overview 2012. Available at: http://www.mercer.com/articles/1462945, [accessed 19/06/2012]

- Dedication strategies match the cash flows of assets and liabilities ('complete immunisation').

The instruments used for implementing LDI strategies are long-term bonds and inflation-linked bonds, but even more so swaps. LDI strategies are expensive, dedication strategies even more so than immunisation strategies. Apart from their genuine costs, the implementation of LDI strategies was further hold back by the underfunding situation of many pension funds in recent years as they require the sponsor to fill the gap prior to the implementation of the LDI strategy as well as the long period of very low interest rates which made LDI strategies even more expensive. According to the Mercer survey, many pension funds have dynamic de-risking strategies in place where ex-ante specified market rates or funding levels trigger automatically the implementation of hedging measures. Furthermore, the degree of certainty with which the actuaries calculate the cash flows of the pension liability diminishes as the time horizon increases. One pension investment consultant conceded: 'There are a number of reasons why your cash flows are going to be imprecise and that is why a precise solution to an imprecise problem seems like sort of overkill'.

Most funds hedge only part of their liabilities, so as to leave room for outperformance. Or, in what is called contingent immunisation, LDI strategies aim at providing only a basic safety net. Therefore, pension funds often hedge the cash flows of the next 10 to 20 years depending on the individual pension funds' maturity, and shift the remaining part of the portfolio into what is termed 'return-seeking assets', which consist of equity as the traditional asset class and the alternative asset classes, which – in the UK – also include property. Applying a LDI strategy in this respect does not necessarily

reduce risk, but it distributes risk in different ways and can also imply actually increasing the risk of the portfolio. Nevertheless, such strategies may present a balanced compromise between the interests of the different stakeholders, but the high degree of investment sophistication clearly requires sound governance structures at the pension funds.

LDI concepts are deeply rooted in the school of financial economics which advocates that companies shall not take investment risk in their pension funds. Their recent popularity is closely related to the implementation of the financial valuation of liabilities in recent accounting standards and partly regulation rules. Drawing on a LDI critical industry report, at the heart of LDI lies a simple logic: When the liability is basically a bond and the assets should be managed to match this bond-like liability to reduce risk, the available asset is a bond[80]. Fore's prediction that the new accounting standards 'will probably change the way pension investments are managed' (Fore, 2005) seems to be accurate.

LDI strategies seem to be taken up especially by smaller companies. This is compatible with the more general trend that smaller companies more than large companies opt out of providing defined benefit pension plans. Apart from the underlying cost argument, there are different triggers for shunning DB pension funds. For many companies complying with the ever complex web of rules set by regulators and accountants became too expensive as it requires increasing internal resources. Also, especially for smaller companies with large DB pension funds the pension fund inherent

[80]Wilshire Consulting (2007). "Commitment-Driven Investing (CDI): LDI as We "C" It. Available at: http://www.wilshire.com/BusinessUnits/Consulting/Investment/CDI_LDI.pdf, [accessed 19/06/2012]

risks became too big in an enterprise risk management context. There are different possibilities to eliminate the risks surrounding DB pension plans. In some countries, merging the pension fund with larger funds seems to be an attractive solution. In countries where this possibility does not exist due to legal barriers, 'the first measure of risk management is to close the fund; the second measure was to implement a LDI strategy' (pension fund manager). Furthermore, especially in the Netherlands and the United States there is a noticeable trend towards outsourcing of the investment function or even the complete management of the pension fund.

Investment strategies will surely be revisited in the aftermath of the second financial crisis within six years. In general, only a straightforward risk reduction in the investment portfolio as e.g. in classical LDI strategies (or very high funding buffers) seems to have worked successfully in shielding pension funds from plunging into new funding gaps.

3.5. Conclusions

The modern risk management revolution arrived at the doorsteps of DB pension funds. This chapter offers an overview of shared trends in risk management of DB pension funds in Germany, the Netherlands, the United Kingdom and the United States. This analysis is conducted, first, in the context of the development of risk management in different sectors of the financial industry taking a comparative view. Reasons for convergence and difference of risk management approaches are deducted from the different nature of the institutions. Second, the practice of risk management at DB pension funds is grounded in the context of the relevant risk factors facing pension funds and their measurement, in regulation and governance.

The new funding focus of pension regulation in the Anglo-American countries marks the shift from affordability towards security. In general, shortfall risk is constructed as the main risk facing a pension fund. This paper argues that the goal of a pension fund is to pay the promised pensions to its members. Funding can be seen as an intermediate target, as an instrument of risk management. As financial economic theory offers up to now no theoretically coercive and unambiguous valuation methodology for pension liabilities, funding remains in a way constructed. Tracking funding ratios over shorter periods of time with, short or no recovery periods in case of underfunding shortens the investment horizon of pension fund.

Furthermore, the accounting standards changed the perception of risk. By applying market values to plan assets and liabilities and recognising the balance in the sponsor's financial statement, the sponsor became exposed to market risk in its balance sheet. Discounting pension liabilities with a bond yield actually aligns the measured risk profile of the pension liability with the risk profile of a bond. Interest rate risk was thus constructed as a main risk factor facing pension funds instead of longevity (and inflation) risk as the basic economic risk factors. Fair value accounting represents a major shift in the way pension funds perceive and manage risks.

As a consequence, investment strategies became more liability-focused and risk-focused. Asset-Liability-Management is firmly established market practice although with different degrees of sophistication and for different purposes. Investment strategies are frequently geared to the goal of avoiding shortfalls thus often lowering the risk profile and hedging interest rate risk. Liability-Driven-Investment (LDI) strategies emerged as a

new strategy to lower or eliminate interest rate risk. Overall, the costs of providing pensions increase.

This has far-reaching ramifications. As the web of regulatory rules became ever more complex – as we showed in section 1.3 – pension funds' risk management became more sophisticated demanding more attention and resources on behalf of pension funds and their sponsors. The risk-taking capacity of plan sponsors is increasingly eroded.

Chapter 4: Governance of Risk Management at Defined Benefit Pension Funds

4.1. Introduction

The question of the adequate amount of investment risk taking by DB pension funds is one of the most important and most controversial theoretical and practical issues in pension economics. The latest financial crisis which resulted in global pension assets declining by over 20 percent until end 2008 (OECD) dramatically refuelled the ongoing debate on the 'right' amount of risk taking. Analysing the consequences of the 2007/2008 financial crisis, the OECD recommended to 'improve the governance and risk management of pension funds', arguing that a strengthening of these two functions may well help to avoid 'some of the declines in assets' (Antolín and Stewart, 2009).

We will not engage in a normative debate on the optimum risk taking but rather enquire into pension funds' practice in investment risk taking and explore the reasons for the differences. We focus on the question why in some countries pension funds on average take more investment risk than in others. We build this question on the

observation that the strategic asset allocation (SAA) of private DB pension funds follows distinct country-specific patterns. Taking equity exposure as a conventional albeit crude measure of investment risk Anglo-American pension funds traditionally took more investment risk than their continental European counterparts. The level of investment risk pension funds take can be clustered on a national scale.

In chapter 3 a first attempt was made to explain the differences in investment risk taking by different governance structures. Following Clark, governance was defined as the 'formal mechanisms by which an institution makes decisions, is held accountable to its stakeholders and beneficiaries, and acts in accordance with public and private standards' (Clark 2004). It was concluded that the risk attitude of the investment decision-makers is indeed impacted by the behavioural implications of governance structures. This chapter takes this discourse further by expounding the problems of governance and its implications for pension funds' investments. We analyse pension fund governance through the lens of corporate finance: We apply contract theory to defined benefit pension funds. As we do this in a comparative cross-country analysis, we will focus on the differences in the legal systems in which the decision-making at pension funds is embedded. Ashcroft, Yermo and Stewart (2011) recognised the importance of a country's regulatory framework for understanding pension fund governance. We extend this view to the inherited legal system. We will first describe the specific agency issues relevant at pension funds which underwrite the governance debate. Second, we will specify the different responsibilities, rights and obligations of sponsors, members and pension fund management as they are outlined by private contract, statute and law. This will enable us to focus on the implications of property rights with regard to the risk attitude of the stakeholders. We will argue that, first, the observed asset allocation reflects

the risk appetite of the decision-makers at the pension fund, and, second, that this risk appetite is grounded in the different governance structures, which are, third, embedded in each country's legal tradition and thus nationally clustered. We will conclude that the pension fund's recourse to the sponsor and the sponsor's access to surplus assets constitute the two most important factors influencing the risk attitude of the pension fund's management.

Although there is a growing body of literature on pension fund governance as academics and practitioners recognise the importance of governance, the interaction between patterns of governance and risk-taking of pension funds is under researched up to now. This paper aims at closing this gap by comparing the situation at employer-sponsored DB pension funds in Germany, the Netherlands, the United Kingdom and the United States.

This chapter is organised as follows: The following section sets the stage by briefly summarising the major theories of modern finance against the empirical background. Section 4.3 reviews the literature on pension fund governance. Section 4.4 explores into the impact of governance on pension funds' risk taking in a comparative country-by-country analysis. Section 4.5 concludes.

4.2. Risk and risk taking

In chapter 3 we summarised the practice of investment and risk management at private DB pension funds which we will detail in chapter 5. We restate the findings here in a nutshell: German pension funds have always been the most risk-averse investors of the here analysed countries. In 2010, 'Pensionskassen' invested 12 percent of their portfolio in 'risk-taking assets'. This risk exposure is significantly lower than during the

second half of the 1990s. According to market participants, 'Pensionskassen' actually had to sell equities thus realising losses. This pro-cyclical investment behaviour of German 'Pensionkasse' contrast with the remarkably stable investment pattern followed by Dutch pension funds, which, since the early 2000s, invested between 35 percent and 41 percent of their portfolio in equity. In the United Kingdom investment behaviour changed dramatically: Traditionally, UK pension funds had the highest equity exposure of all OECD countries at around 70 percent. This was reduced to around 40 percent. The equity exposure of US pension funds used to be around 60 percent. Here, we can distinguish two phases. Following the market crisis 2000-2003 pension funds increased their risk exposure, thus gearing up considerably. The de-risking phase seems to have started in 2007. We can conclude that with hindsight the turn of the century may have marked a caesura in pension funds risk management as DB pension funds started to de-risk.

The belief that a higher return necessitates higher risk taking, i.e. that there is on average a positive relationship between return and risk, belongs to the cornerstones of financial economics[81]. Furthermore, the higher the return on pension fund's investment the lower the costs for the plan sponsor under an employer-financed DB plan. Van Nunen (2008) for instance calculated that an increase in investment returns of one percentage points reduces the costs of the plan by 30 percent. The question of how to invest pension assets is thus one of the most important questions in pension economics.

[81] Tobin (1958) derived the positive relationship between risk and return in a portfolio-theoretical concept: The risk-averse investor only accepts higher risk in return for higher interest-rates what translates into 'the investor can expect more return if he assumes more risk' The necessary extent of the risk premium for holding equity instead of bonds has since then been the topic of a large body of literature in financial economics, especially since the publication of Mehra, Prescott and Edwards (1985)

Financial economic theory does not provide us with an unambiguous answer to this fundamental question. The debate on the appropriate investment and funding theory for DB pension funds started in the 1970s in the United States and is thus embedded in the legal context of the US at that time. From the beginning, it was highly controversial. Whereas one school argues that the company should not take any risk at all in its pension fund and favours an all-bond portfolio, another school favours an all-equity portfolio. The latter was derived by Sharpe in the theoretical context of a pension fund which is fully integrated into the company and shielded by an Pension Insurance Fund in the case of bankruptcy (Sharpe, 1976). The all-bond approach is built on a tax-arbitrage argument (Tepper, 1981). Both schools are based on the principle that the pension fund forms an integral part of the company and that the company has decision-making authority at the pension fund ('integration theory'). The ideas of the US financial economics, mainly Sharpe, Tepper, Black and Bader, were later transferred to an UK context and adapted to an actuarial approach by Exley et al. (1997).

The integration hypothesis was increasingly controversially discussed in the United States. Ippolito (1985) developed the 'implicit contract theory' of DB pension contracts according to which 'the pension plan is an "implicit contract" between the worker and the firm'. Companies will not exercise their legal right to terminate the pension plan at any time but honour the pension promise as they are aware of impending wage penalties if not. This theory implicitly challenged the assumption of the ownership of the firm over pension assets. When pension contributions are actually deferred wages, pension assets necessary to fulfil the 'contract' cannot be treated as an integral part of the

company. The introduction of an excise tax on excess assets in 1986[82] in the United States actually ended company's disposition over excess assets in the pension fund (Ippolito, 2001). The separation theory evolved which 'recognises a more complex role for pension assets in the contractual relationship between labor and the sponsoring firm' (Alderson, 1986). Clark and Monk (2008) criticised the 'implicit contract theory' arguing that the DB pension is 'in its current form, an explicit contractual guarantee' rather than an implicit contract. This view further loosens company's grip on pension assets. Coming from a UK context, Sutcliffe (2005) questioned the validity of the integration hypothesis for the United Kingdom on the grounds of the strong position of the trustees in the United Kingdom and favoured deliberate active risk taking for the sake of cost reductions and therefore affordability.

Alderson (1986) pointed out the importance of property rights as a starting point for the investment of pension assets. We agree with this view and argue, that different national jurisdictions specify property rights at DB pension funds in different ways thus also providing different incentives to the decision-makers at pension funds with regard to investment and funding. In an excellent survey of this debate, Orszag and Sand (2006) draw the conclusion that 'modern finance theory does not provide an answer to [...] the most fundamental questions in pension finance'. We would argue that the problem of investing pension assets is in fact not solvable in a general global setting but needs to be answered in its specific national legal context.

[82] Initially set at 10 percent, the tax rate was increased to 15 percent in 1988 and finally to 50 percent in 1990. This ended the tradition of automatically reverting the excess assets to the sponsor in case of termination.

4.3. Focussing on pension fund governance

> *'Good governance is increasingly recognised as an important aspect of an efficient private pension system, enhancing investment performance and benefit security'* (Stewart and Yermo, 2008).

This OECD statement summarises the attention pension fund governance has attracted recently by academics, consultants and pension funds. Albeit a young field of academic studies, an increasing amount of academic work has been dedicated to researching pension funds' governance. As rising longevity increases the costs of supplying pensions throughout the world, the performance of pension funds is more closely scrutinised and the question is asked why some pension funds seem to perform better than others. Increasingly, pension fund performance is linked to governance. Good governance is believed to have a 'significant incremental difference to value creation as measured by their long-term risk-adjusted rate of return'(Clark and Urwin, 2008a). The OECD took a leading role in promoting international governance standards for pension funds. The first set of guidelines for governance standards for pension funds was approved by the OECD countries in 2002. More recently, the OECD revisited governance standards, concluding that 'improving governance standards remains a challenging task for pension funds and their regulators around the world' (Stewart and Yermo, 2008). The fact that also Investment & Pensions Europe (IPE) commissioned a review of pension fund governance may serve as an indication of the high awareness pension funds and their surrounding financial industry dedicate nowadays to governance issues. The author states, that this review 'comes at a time when pension fund governance is, once again, at an all-time high' (Holden, 2008).

The link between pension fund performance and governance was established in the 1990ies by two separate research projects led by Mitchell and Ambachtsheer

respectively and confirmed in a more recent project by Clark and Urwin. Recognising the importance of pension funds for the social welfare of many citizens and the importance of the performance of pension funds for the economic cost of public and private sponsors alike, the researchers ask the question how to improve pension fund performance. Researching public pension funds in the United States, Mitchell found that pension funds produce higher yields and are better funded when pension funds manage their funds professionally instead of relying on employee-trustees (Mitchell and Hsin, 1997). Furthermore, pension governance policies affect the choice of investment strategies especially with respect to the use of tactical investment and the extent of equity and international investment which in turn has a powerful effect on pension fund performance (Useem and Mitchell, 2000).

Ambachtsheer started an international research project on pension fund governance in 1994. By regularly surveying a large group of senior representatives of international pension funds, he created a powerful and unique database, from which he draws his conclusions. First findings identified poor processes, inadequate resources and lack of clear mission as main shortcomings for poor pension fund performance. Follow-up projects found that a lack of consensus and clarity about the pension fund's goals and strategic positioning remained a main weakness. Thus, clarifying the 'pension deal', i.e. the allocation of risks and rewards between the stakeholders, would help to improve the decision-making of the board of trustees. Effective governance and improved organisational design would further improve pension funds' performance. Ambachtsheer et al. (1998) conclude that good governance can increase a pension funds' risk adjusted performance by at least one percentage point per year. The findings from the 2007 project

(Ambachtsheer et al.) identified board competency as the remaining main weakness of pension funds' governance.

In a study of the governance structure of large pension funds around the world, Clark and Urwin (2008a) developed models of best-practice pension fund governance based on an international research project. The authors identify as key principles of good governance *organisational coherence*, which includes the clarity of mission of the institution, *people*, i.e. skills and responsibilities of the people involved in the investment process, and *process*, namely how the investment-making process is organised and implemented. In doing so, the authors recognise the differences between large and small pension funds and adjust the organisational structure they recommend accordingly thereby aligning organisational structure with size and the complexity of investment. The expertise in investment decision-making is identified as a key quality of best-practice pension funds. Ambachtsheer (1998) and Clark (2004) observed that size is a constraint on pension funds' performance. Large pension funds benefit from lower administrative and investment costs reaping economies of scale (Bikker and de Dreu, 2006; Ambachtsheer, 2009). The adequacy of the compensation of board members and investment professionals constitutes a further important issue for pension funds as well as the questions of leadership (Clark 2008b). Clark and Urwin (2008a) conclude that 'governance is best treated as investment in long-term performance' and that the 'governance budget is part of the management of risk and return'.

Change has been noticed. Clark and Urwin (2010) identify innovations in governance practices at UK pension funds following the GFC. Mostly, pension funds simply implement The Pension Regulator's Code of Practice; some larger funds develop more innovative models by drawing on the UK corporate governance code. More

fundamental changes include the fiduciary model and the UK market for buy-outs. The fiduciary model delegates investment and risk management partly or completely to an external agency while retaining the pension liability and the plan assets whereas under a buy-out the pension fund is transferred to an insurance company. Both innovations are a viable solution to the twin problems of poor organisational systems and missing expertise of the decision-makers inherent at UK pension funds (Clark 2008).

Clark, Caerley-Smith and Marshall (2006, 2007, 2009) found the decision-making competence of pension fund trustees in the United Kingdom very heterogeneous with far reaching ramifications for the governance of pension funds. Stressing the importance of knowledge and consistency of decision-making they concluded that the 'average trustee may not have the education and professional qualification' to meet the expectations of the policy makers and fulfil the central role they are supposed to play at British pension funds (Clark et al., 2007). Also in the Netherlands trustees were found to display behavioural biases (van Dalen et al., 2010). A similar exercise in scrutinising pension fund trustees competency is still outstanding in the context of the United States where the role of trustees is equally vital in managing pension funds. Clapman et al. (2007) identified some shortcomings but focused on developing best-practice principles of pension fund governance.

4.4. A contract-theoretical analysis of pension fund governance

We will apply contract theory to pension fund governance. The pension fund's governance structure framed by legal stipulations determines the distribution of claims and defines the process of decision-making. We will argue first that there is a complex agency relationship at DB pension funds as there are two groups of principals whose risk

attitudes may differ. Second, the specific contractual arrangements which we can find at pension funds in different countries distribute property rights differently. Thus, it is argued here that national pattern of governance exist which inform the risk attitude of the decision makers.

We use contract theory as an intellectual tool, not in a philosophical sense. Organisational scholars criticise contract theory for being unnecessarily unrealistic and one-sided (Perrow 1986). We do not want to idealise 'contracts' either but we share the opinion that contract theory offers a useful perspective on agency problems (Eisenhardt 1989). We are aware that the conception of contract itself is ambiguous: 'Contract' means different things to different people. The following citation may serve as an illustration: 'The economists' conception of a "contract" as an arrangement between two or more actors supported by reciprocal expectations and behaviour is far broader than the lawyer's conception, which focuses on the existence of judicially cognizable duties and obligations' (Gordon, 1989). Furthermore, a 'contract' is differently interpreted in different countries. We owe important insights into the relevance of the inherited legal system for capital markets and the economic development of countries to La Porta et.al (1996, 1997). They argue that the fact that common law countries such as the United States and the United Kingdom have so much larger capital markets than civil law countries such as Germany is due to the stronger investor protection provided by common law. We share the view that the inherited legal system is relevant for the development of financial institutions and will apply the distinction between civil law and Roman law countries to pension fund systems later on.

4.4.1. Outlining contract theory

We apply the 'nexus of contracts' view of the firm as developed by Coase (1937)[83], Jensen and Meckling (1976) and Fama and Jensen (1983a,b) for analysing the agency problem at pension funds. Initially, the principal-agent problem was formulated in the context of the managerial led firm resulting from the separation of ownership and control at a corporation[84]. But the view soon broadened as the principal-agent-problem is inherent in all organisations which are characterised by delegated decision-making: 'Examples of agency are universal' (Ross, 1973). More recently, academics applied agency cost analysis to the Anglo-American trust (Sitkoff 2004), thereby strongly building on the contractarian view of the trust developed by Langbein (1995): 'Trusts are contracts'. While this research does not – in our view – dismantle the principles of fiduciary duty which govern the Anglo-American trust of their moral dimension, it recognises the web of contracts underlining the trust. We further build on the work of Besley and Prat (2003) who developed a framework for analysing pension fund governance from a contract-theoretic perspective. Their results stress the central role of the link between residual claims and the allocation of control rights in private pension funds. We share this view. But whereas Besley and Pratt developed a general framework which they applied for the analyzing for the choice between DB and DC pension plans, we will make the attempt to 'dig deep' into the historically and culturally grown legal roots which define the property rights in different way in different countries.

[83] By recognising the importance of transaction costs, Coase (1937) showed that institutions do matter. The analysis of transaction costs and the critical role of institutional framework became the main concern of the New Institutional Economics established by Williamson (2000). North (1990) outlined the analytical framework for integrating institutional analysis into economics and economic history and recognised that institutions structure interactions and influence behaviour.

[84] According to our knowledge, Adam Smith (1776) was first to point out the principal-agent-problem inherent in the managerial-led firm, although usually cited are Berle and Means (1932) who pointed out the separation of ownership and control of companies in the United States and its scope for possible abuse of power.

Contract theory views an organisation as a web of explicit or implied contracts. Agency problems are caused when the actions of the management are unobservable by the shareholders giving rise to moral hazard: The management does not act in the shareholders best interest. Jensen and Meckling (1976) define the agency relationship 'as a contract under which one or more persons (the principal(s)) engage another person (the agent) to perform some service on their behalf which involves delegating some decision making authority to the agent'. Asymmetric information between the agent and the principal gives rise to adverse selection[85]. Agency cost incur in form of monitoring and bonding expenditure to align the agents' decisions with the interest of the principal. The remaining loss of welfare to the principal as residual claimant resulting from misaligned interests is termed 'residual loss' by Jensen and Meckling. Central in this view is the position of the residual claimant whose claims are only settled once the legal claims of all other stakeholders are settled. Corporate governance thus 'refers to the ways of ensuring that corporate actions, assets and agents are directed at achieving the corporate objectives established by the corporate shareholders' (Sternberg, 1998). But as in other organisational forms residual claims are differently characterised, distributed and restricted, the identity of the residual claimant shifts accordingly with far reaching ramifications as 'different rules on residual claims imply different rules for optimal [investment] decisions' (Fama and Jensen, 1985). We focus here on the positive aspects of the theory thus following Jensen and Meckling in assuming that the normative problems are solved and investigate the incentives faced by the stakeholders. Individual rights which are generally specified through contracting determine how cost and rewards will be allocated among the participants in any organisation. The 'individual behaviour

[85] The literature on moral hazard and adverse selection is very broad and summarised in textbooks on corporate finance, see e.g.Tirole (2006).

will depend upon the nature of these contracts'[86]. These property rights are specified by private contracts between the owners and the managers of the firm but bound by statutory law. Thus, property rights are deeply embedded in the legal and cultural history of a country.

Initially, contract theory assumed complete contracts. The 1990s saw the development of research of incomplete contracts. Hart and Moore (1999) developed the formal model providing the foundation for incomplete contracts. Whereas a complete contract specifies for all contingencies based on all relevant information and which are verifiable in the sense that the contract is observable by a court, this is not the case for an incomplete contract (Segal, 1999). Unforeseen contingencies in the sense that contracts cannot specify for all future contingencies are thus the main reason rendering contracts incomplete. Further events are the cost of writing contracts (even if all contingencies were foreseeable, the writing of the contracts becomes too expensive) and the cost of enforcing contracts, meaning that contracts need to be enforceable by courts (Tirole, 1999)[87]. An incomplete contract leaves residual control rights to the agents which should according to the property rights approach be exerted by the owner. Incomplete

[86] Please note, that although the term 'behaviour' was used by Jensen and Meckling and will be used throughout this chapter, neither Jensen and Meckling's work nor this humble piece of research represent an exercise in behaviouralism as developed by Kahnemann and Tversky (1979). 'Behavoir' is used in a rather deterministic way, rationally determined by its contractual embeddedness. As we want to compare different investment behaviour resulting from the differences in the legal system between countries, we deem this to be an adequate approach. We acknowledge its shortcomings though and concede that it would be inappropriate for analysing differences between pension funds in identical legal surroundings. In that case, we would rather turn to Cyert and March (1963).

[87] The literature is neither entirely clear regarding the definition of complete contracts - Tirole (1999) cites the counterfactual, meaning a contract is complete as long that adverse selection, moral hazard and hidden knowledge are precluded - nor is the relevance of incomplete contracts undisputed. Maskin and Tirole (1999a) developed the irrelevance theorem of incomplete contracts arguing on formal grounds that as long as the parties are unboundedly rational, contingencies are never unforeseen, and thus contracts nor incomplete.

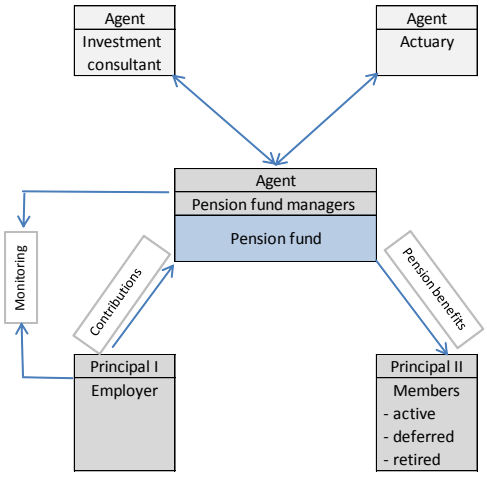
contracting is highly relevant for pension plans especially with regard to unforeseen contingencies, which is a common phenomenon in long-term planning, as will be shown in more detail in section 4.4.3.

4.4.2. The agency relationship at DB pension funds

The agency relationship is inherent in DB pension funds: Consider a stylised example of a pension fund as shown in figure 4.1: The employer sponsors a pension fund with the purpose of providing retirement benefits (usually also death and invalidity insurance) to the members. The entitlements of the beneficiaries are specified by the pension plan which thus settles the contractual relationship between the beneficiaries and - depending on national rules - the pension fund or the sponsor. These terms of the pension benefits are set by the sponsor or negotiated in collective bargaining. The resulting contract can be rather complete such as a British final salary plan with specified inflation-indexing or rather incomplete, such as a Dutch average-salary plan with conditional indexing. This pension fund is managed by pension fund managers, which we usually term in common law countries 'trustees'. The trustees exert managerial authority at the pension fund. If we accept that it is the ultimate goal of the pension fund to meet the pension promise, then the pension plan specifies the task for the trustees. The terms of the pension plan and the respective regulations and laws serve as ex-ante instructions of the trust settler. The trustees are either directly nominated by the sponsor or nominated by the beneficiaries or a third party (e.g. The Pensions Regulator in the UK has under certain circumstances the power to appoint trustees) but finally approved and appointed by the sponsor. They thus enter a (explicit or implicit) contractual relationship with the sponsor. In a contract-theoretical approach both members and employer qualify and act as principals. We thus follow Sitkoff (2004) in his assessment that 'where the corporate

form presents one dominant source of agency costs (the shareholder / manager relationship), the trust presents two'.

Figure 4.1: Agency relationship at DB pension funds



Source: The author

We thus explicitly introduce the sponsor as second principal of the pension fund. In this agency relationship, which is depicted in graph 4.1, we are confronted with two main principals namely members and sponsor. The members can be further differentiated into active, deferred and retired members; at large pension funds their number can count several thousands of individuals. This raises significant problems of organisation, information and representation[88]. In some countries these problems are being addressed by demanding regular general meetings of the members (e.g. Germany) or legally specifying the information policy towards the members (e.g. Netherlands).

[88] The same holds true in case of multi-employer pension funds which had been set up as part of collective bargaining such as Taft-Hartley pension plans in the United States but this is beyond the scope of this paper to explore.

More often than not, the pension fund employs further consultants itself, usually an outside actuary, often investment consultant, also lawyers or investment banks. They enter an agency relationship of their own with the pension fund as principal. This agency relationship is characterised by a potential conflict of interest of its own which we will not further explore into[89].

All legislations state that the pension fund managers have to act in the best interest of the pension fund members. In the Anglo-American countries this relationship is governed by fiduciary duty on which there is an immense literature. But at the same time, the sponsor has an economic interest in the pension fund as he has to 'foot the bill' of providing pension benefits. The legitimacy of the sponsor's interest is very differently treated under different legal systems. US law for example explicitly states that trustees have to be cost-conscious in their decision-making, that the provision of pension benefits should happen at 'reasonable expenses'[90].

The agents (usually trustees or fiduciaries, or more generally, pension fund managers) are appointed by the principals, sometimes by the employer only, sometimes by sponsor and members[91] on equal terms. The civil law countries Germany and the Netherlands apply formal institutional structures for the oversight of the pension fund culminating in Germany's two-tier board system derived from corporate governance. The Anglo-American trust derived from common law lacks these formalised structures. A

[89] It is worth noting here that in the American pension fund literature 'the term "agency" refers to the misalignment of interests between principals (pension fiduciaries) and agents to provide specific services to the plan (McGill et al., 2010).
[90] ERISA, subtitle B, part 4, §1104
[91] In some countries, e.g. Germany, only active members have a voting right and qualify as fiduciaries, in other countries. e.g. the Netherlands, member nominated trustees are further segregated into active and retired members' trustees.

balanced representation of stakeholders in the governing bodies is seen an important ingredient in better aligning the interest of the principals (Stewart and Yermo, 2008). The rules concerning their appointment are specified either by law or by private contract. The same applies to the decision-making authority of the agents. There are different rules regarding the agents' discretion over the key variables, i.e. strategic asset allocation and contribution rate and - in some countries - indexing of pension benefits. The first goal of the pension fund - and thus the agents - is to provide benefits to the members. They are thus codified by private contract and embedded in the respective national legal framework. The second goal of the pension fund is to provide for goal number one at 'economically reasonable costs'.

Agency costs can be expected to occur as well in this agency relationship. The agents can be expected to be monitored mainly by the employer who has first of all an economic interest and who can be expected to have means, knowledge and understanding to monitor the pension fund superior to those of the plan members[92]. Monitoring on behalf of the beneficiaries depends on the organisational degree of the beneficiaries and is rather exercised by the regulating authorities[93] and finally the courts. Bonding costs may occur for instance in the case of insider trustees, i.e. trustees who are also executives at the sponsoring company, and who may act more in the interests of the sponsor. Investigating the corporate governance of pension plans in the United Kingdom, Cocco and Volpin (2007) found evidence of this agency problem. We focus here on the 'residual

[92] Pension plans where the employer opted-out of the risk-sharing mechanism incur interesting problems of monitoring comparable to the loss of the monitoring function of banks in full securisation. The recent policy focus on the allegedly bad governance of DC plans might serve as a point of reference.

[93] Consumer protection or more specific protection of the rights of the beneficiaries is the main rational for pension fund regulation (for further detail see chapter 1.3.)

loss' as defined by Jensen and Meckling which may be caused for both employer and members in the case of trustees not well aligning the interests of both groups of principals for a number of reasons, as this might lead to unintended results of either too much or too little risk-taking. We do not explore the process of decision-making within the pension fund. In this respect we follow the neoclassical tradition in treating the pension fund as a black box. We focus entirely on the decision-making of the pension fund in relation to its two main groups of principals, i.e. sponsors and members.

4.4.3. Mapping the risk attitude of the principals at DB pension funds

Our starting point here is simple: We stay in the neoclassical theory in assuming that people are generally risk-averse; they are only inclined to take risk if they can also reap a reward. We will not explore into the necessary extent of the required risk premium but merely describe the factors that drive the risk attitude of employers and employees as the two main principals of a pension fund.

Generally, the employer as an organisation is depicted as risk-neutral. If we assume an employer-financed pension plan with fixed benefits we would expect the employer to aim at minimising her or his funding costs. To do this, she or he would be willing to favour investment risk taking in the pension fund, as long as she or he can benefit from the excess investment returns, i.e. investment returns that exceed the level necessary to fund the benefits. We term this the surplus. The employer's reward for taking investment risk is thus the recovery of the surplus. The risk is that the returns fall short of what is needed for funding purposes and that the employer must fill the gap by additional contributions. This option of the pension fund to fall back on the sponsor is

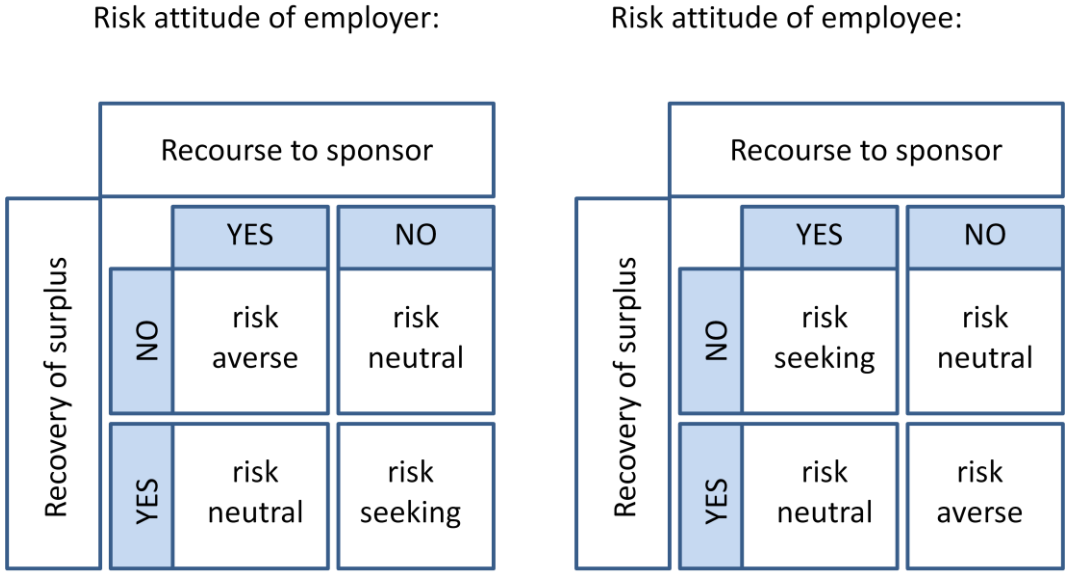
usually termed ‘recourse to the sponsor’. Under the nowadays prevailing regulatory rules regarding the funding of the pension fund if this is a rather immediate obligation of the sponsor opposed to the situation that she or he only acts as ‘lender of last resort’ in the sense that imputed funding gaps need only to be filled at the time of the actual payment of the pension benefit.

We further define a situation as risk neutral when the employer is exposed to risk but can also reap the reward. This situation is given when employer is able to recover the surplus but is also subject to recourse by the pension fund. Risk neutrality is equally given if there is neither risk nor return, i.e. the pension fund has no recourse to the sponsor but neither can the employer recover the surplus. The first situation basically describes the situation at the traditional final salary pension fund, the latter is consistent with a DC plan. The employer would turn risk-averse if she or he has fill the funding gaps at the pension fund without having recourse to the surplus. And finally, a situation where the employer can benefit from superior investment returns without having to give recourse, would turn an employer risk-seeking.

Employees can be expected to focus on the safety of their pension. With their pension benefits being fixed they have no primary interest in the level of investment risk at the pension fund. Plan members probably do not mind some risk taking as long as the risk does not threaten the solvability of the plan sponsor and as long as there is recourse to the plan sponsor. In this situation they would be rather expected to welcome some risk-taking as lower costs of funding the pension plan strengthen the sponsor’s covenant, but, basically, their attitude towards risk is neutral. Risk-neutrality can also be expected if neither the pension fund can take recourse to the sponsor nor can the sponsor recover the

surplus. As long as the contributions are sufficiently prudently calculated to produce the promised pension benefit, some calculated risk-taking could strengthen the funding situation of the fund thus further enhancing the safety of the pension promise. The risk neutrality of the plan members could be expected to be distorted if either the employer can recover surpluses without writing the put option or in the situation that the pension fund has recourse to the sponsor but the latter cannot recover the surplus. Whereas the first situation would turn plan members risk-averse, the latter is more difficult as it involves unresolved ownership of excess assets of the pension fund. When we assume that a persisting surplus would finally be used to enhance pension benefits, employees could actually become risk-seekers, as they are insured on the downside by the employer's put option. Figure 4.2 summarise the risk attitude of employers and employees:

Figure 4.2: Risk attitude of employer and employee



Source: The author

The figure shows that the risk attitude of employees and employers is not always identical. In cases of asymmetric risk/reward patterns their attitude towards risk might become contradictory. In these situations, a dilemma for trustees is created as a ranking order is needed to solve the conflict of interest, which is not easily provided. The interesting question is now, how will the agents solve this dilemma resulting from conflicting risk attitudes of their principals?

4.4.4. Specification of property rights

We argued that the risk attitude of the principals is determined by the distribution of risk and reward. This distribution is specified by legal contract. The pension plan, national pension fund regulation and national social and labour law specify the property rights of the principals of the pension fund. How agents decide in case of conflicting interests of the principals depends on with which party they are closer aligned which is again explicitly or implicitly specified by legal contract. In the following section, we will therefore look closer into the property rights at DB pension funds and their implications for the decision-making of trustees.

Pension fund members (principal II) are entitled to pension benefits, which are funded by the employer (principal I). Under a traditional final salary DB plan the employer alone bears investment and longevity risk. But increasingly we have also pension plans which are co-financed by employer and employee or financed by the employees only. Even though one might argue that it makes no difference if employers or employees finance the contributions as they are deferred wages anyhow, it may change the risk profile of the plan, as will be shown in more detail later. The pension benefits members are entitled to may be fixed by nature or flexible depending on the pension

formula. The choice of the plan and the terms of the plan ('generosity') are in the discretion of the employer or negotiated in collective bargaining.

The following section will outline the pension property rights under the different systems. We will first explain the different relevant risk factors and second their distribution between stakeholders. Thereby we focus on the salient features of the systems only, for further detail please see chapter 5.

4.4.4.1. Definition of risk factors under a DB pension plan

Longevity risk describes the risk that the actual life expectancy of plan members deviates from the expected one. If people live longer than expected, pensions need to finance private consumption over a longer span of time. If the pension benefit is provided in the form of an annuity, i.e. 'a flow of income that is payable to the beneficiary until death' (Cannon 2008), rising longevity incurs higher costs to the provider of the annuity. If the pension benefit is paid as a lump sum, i.e. a one-time payment at the beginning of retirement, then the retiree herself or himself must split it into smaller bits to make it last longer or risks running out of financial means in old age. Under a lump sum plan, longevity risk is borne by the plan member; the employer is shielded from cost increases. As in the here analysed countries pensions are mostly (wholly or partly) provided as annuities we will neglect lump sum plan in the further course of this paper. Rising longevity has been the experienced reality in all countries over the last decades, but, theoretically, longevity risk could also occur in the form of falling longevity, thus entailing unexpected rewards.

Investment risk refers to the risk that investment returns deviate from the expected returns. Given the observed volatility of financial markets over the past decade, investment returns are the least predictable variable. Furthermore, it is a symmetric risk as investment returns can be higher or lower than expected thus incurring costs or rewards. The distribution of investment risk is defined by the pension plan and legal stipulations.

A further risk category under DB pension plans is the risk that the beneficiaries lose their pension. This may happen if the sponsoring employer becomes insolvent and the pension fund assets are not sufficient to pay the vested benefits. The United States ('Pension Benefit Guaranty Corporation', established 1974) and the United Kingdom ('Pension Protection Fund', established 2004) have established Pension Insurance Funds to insure pension plan members against the loss of the pension. The rules differ, but in all cases plan members are not fully compensated. The Netherlands and Germany[94] do not operate Pension Insurance Funds for pension funds but build the safety of the pension promise instead on requested funding buffers of the pension funds. These pension funds are furthermore separate legal entities which legally own the assets. Maatmann (2004) thus argued that this 'eliminates the risk of bankruptcy of the employer'. Also, employees may run the risk of discontinuity of pension accruals and the loss of not yet vested accruals due to the closing of the pension plan. In the Anglo-American countries the closing of a pension plan both to new entries and to new accruals is at the discretion of the employer. As the statistics show, this risk is far from being a purely theoretical case. In Continental Europe on the other hand, there is no easy opt-out of an existing plan for

[94] Germany operates a Pension Insurance Fund ('Pensions-Sicherungs-Verein') that covers the direct pension promise and the 'Pensionsfonds' but not the insurance-style operating 'Pensionskasse', which is the focus of this paper. A number of 'Pensionskassse' ('regulierte Pensionskasse') though are covered by the Re-Insurance Fund of the life insurance companies in Germany ('Protektor').

the employers. In Germany, pension plans may be closed to new entries and new plans with less generous terms can be set up to replace them, but it is legally not possible to close a pension plan to current members without the consent of the members[95]. In the Netherlands, provision of occupational pensions is de-facto mandatory. Employers can opt-out of operating a pension fund themselves by transferring it to other providers of occupational pensions but they cannot opt-out of paying the employer contributions. Thus, solvency risk is relevant mainly in the context of the Anglo-American countries, where it constitutes the key risk for pension fund members. In the UK, trustees have started to regularly access the strength of the 'sponsor covenant', i.e. monitor the financial performance of the sponsoring company to gain better understanding of the intrinsic value of the contingent liability (Thornton and Fleming, 2011).

4.4.4.2. Distribution of risks and rewards under DB pension plans

The distribution of risks and rewards between the principals of a pension fund is specified by private contract framed by law and regulation. We differentiate here between final salary, average salary and hybrid pension plans. These plans reflect, firstly, the changing nature of the pension promise as plans developed from final salary plans into plans with more risk-sharing features even when the basic character of a DB pension plan is confined. Secondly, these idealised plans are constructed to reflect the reality in the Anglo-Saxon countries (final salary plan), the Netherlands (average-salary plan) and Germany (hybrid plan). Details of the plan design of the countries are explained in chapter 5.

[95] In general, impairments of benefits need the explicit consent of the employees. For more detail please see chapter 5 in Höfer (2004).

4.4.4.2.1. Final salary plan

Under the traditional final salary plan pension benefits are determined by a plan-specific formula linking benefits to the income of the member at retirement (or an average income of the last years of employment) and the number of years of employment. Pension benefits are paid as an annuity. Contributions are paid by the employer only. Under a final-salary plan, benefits are (semi-) fixed by nature. Benefits might be enhanced in case of persisting surpluses of the pension fund but they might not be changed for the worse at the discretion of the employer. Longevity and investment risk are born by the employer only; the employee's risk is confined to solvency risk to the extent that her or his vested accruals are not insured by a Pension Insurance Fund. The employer is obliged to cover shortfalls in the fund resulting from lower investment returns or rising longevity. In principal, the employer is also rewarded in case of higher investment returns than expected or lower longevity as she or he can take contribution holidays, i.e. suspend the employer contribution, if the funding level of the pension fund exceeds 'fully funding'. Once a surplus has accumulated within the pension fund, access to these excess assets is difficult as will be pointed out in more detail in section 4.4.3.3.

4.4.4.2.2. Average-salary plan

In an average salary plan, pension accruals are linked to the annual salary of the member earned in every year of service. As individual wages usually increase every year (career factor and wage inflation), this is an important difference to final salary plans: An average salary plan does not automatically include 'automatic wage indexation'. We take the Dutch system, where inflation-indexation of pension accruals is an explicit policy goal of pension funds but not guaranteed but conditional on the financial situation of the

pension fund. Thus, pension benefits are partly flexible by nature. The plans are financed mainly by the employer but with a mandatory contribution from the employee. Contribution rates are agreed on yearly by representatives of employers and employees in what is termed a 'pension deal'. Here, the employee participates in investment and longevity risk in addition to solvency risk.

4.4.4.2.3. Hybrid pension plan

Hybrid plans combine average salary plans with additional guarantees. We refer here to the German pension plan 'Beitragszusage mit Mindestleistung', which is the German version of a DC plan but with some minimum guarantees for the employee. Indexing of neither pension benefits nor pension accruals is required. As benefits are mostly paid as annuities, longevity risk is borne by the pension fund and ultimately the employer. Investment returns accrue to the employee who is shielded against nominal losses by a zero-interest-rate guarantee of the employer. Under this plan, the risk-reward constellation becomes asymmetric as the employer bears the risk of extra contributions in case of adverse investment results but cannot reap the upside. This plan is often only employee-financed.

4.4.4.3. Specifying the 'residual claimant'

Corporate finance theory defines maximising shareholder value as the goal of a corporation. As was discussed before, the reason for maximising the utility of the shareholder and not the utility of all other stakeholder lies in the 'residual claimant' position of the shareholder. If we transfer this to the DB pension fund, this gives raise to the question: Who is the residual claimant at a DB pension fund? We define the 'residual

claimant' at a DB pension fund as the owner of the excess assets (surplus). We thus rephrase the question into: Who is the owner of the surplus? We define ownership in the sense of residual control rights. The owner of the surplus is thus the one who can exert control over the surplus. This seemingly simple question is surprisingly difficult to answer.

The Anglo-American final salary plan seems to represent a rather complete contract. The benefits are fixed by nature. The Anglo-American countries are firmly grounded in the common law of trust where the principles of fiduciary duty origin from. As the trust is not a separate legal entity, any deficit of the pension fund is an unlimited liability to the sponsor. Inversely, the sponsoring employer owns the surplus. But in both the United Kingdom and the United States this property right is restricted:

In the United States an employer is entitled to withdraw pension assets only in the case of a termination of the plan. These withdrawal are subject first to corporate income tax (to compensate for the favourite tax treatment of contributions) and second to an excise tax of 50 percent. The excise tax was introduced in 1986 at initially 10 percent to stop politically controversial reversions of pension plans often involving corporate takeovers. The tax was increased to 15 percent in 1988 and 50 percent in 1990. It can be reduced to 20 percent if the surplus is shared with the plan members (Pang and Warshawsky, 2007).

In the United Kingdom the cases which allow for a payment of the surplus to the employer are defined by law. In principle a reversion of the surplus is possible if the trust

deed allows for it and the surplus exceeds the buy-out value[96]. This may occur in an ongoing scheme (Pensions Act 1995, section 37) or in the case of winding up (Pensions Act 1995, section 76, 77). If this occurs in the course of corporate transactions further clearance by The Pensions Regulator is required. In any case, a tax rate of 35 percent applies. Previously, the 1986 Finance Act introduced criteria to deal with pension fund surpluses. This legal requirement was enacted against the background of soaring pension fund surpluses in the wake of the 1980s stock market boom. It was required that surpluses had to be reduced to a maximum of 5 percent within five years by either reducing contributions, increasing benefits or reverting the surplus to the company (Blake, 2003).

Thus, in both countries, the sponsor's access to surplus assets is restricted whereas the sponsor's liability is unlimited. Employers can benefit mainly through contribution holidays from better than expected investment results. Pension benefits are fixed by nature but legally flexible on the upside. Both countries have legal stipulations which encourage the increase of benefits in case of surpluses (which renders the pension contracts partially incomplete), but this is not a legal requirement.

Under the Dutch legal system the pension fund is legally entitled to the pension assets but the pension fund invests on behalf of its stakeholders to whom all surpluses or deficits eventually accrue. Maatman (2004) makes the argument that this separation between legal entitlement and economic interest results from the fiduciary relationship which also occurs at the pension funds: 'The pension capital belongs to the pension fund; the economic risk lies with the stakeholders'. The Dutch system does not dispute the

[96]HM Revenue & Customs, S177, The Registered Pension Schemes (Authorised Surplus Payments) Regulation 2006. Available at: http://charterconsultation.hmrc.gov.uk/manuals/rpsmmanual/RPSM04102020.htm, [accessed 01/06/012]

interests of the employer. The pension fund has to serve both the interests of the employer and the beneficiaries. In case of conflict, the interests of the beneficiaries should prevail. Acknowledging the duality of interest results in my view from the Dutch pension plan design. Under an average-salary plan as outlined in section 4.4.4.2.2. both employer and employees qualify as residual claimants as the benefits are partly flexible. This would render the pension contract incomplete. With the so called 'pension deal' an attempt is made in the Netherlands to complete the contract by specifying for contingencies. A pension deal describes 'the contract between the pension fund and the stakeholders that set out the nature of the pension promise [...], the funding of this promise and how the risks in the funding process are allocated [..] amongst the stakeholders (Kortleve and Ponds, 2006). Under a Dutch pension deal, a pension policy ladder usually specifies what happens under certain financial conditions at the pension fund. The financial variables are linked to the funding status of the fund. The pension contract would specify the funding level above which benefits would be fully indexed, when catch up indexing of benefits would start, when the contribution holidays would begin or also when to revert the surplus. In the Netherlands, the employer is legally entitled to reverse the surplus given that the financial condition of the pension fund allows for this also in an ongoing pension fund. On the downside, the contract also specifies the funding level when to dispend indexing and when to increase contributions. But also the Dutch pension deal does not provide legally binding agreement for all eventualities. Given the long time horizon of up to 45 years of active and a further 15 to 20 years of retired membership or contract duration, this is not surprising but inherent in long-term contracting. It is an attribute they share e.g. with many life insurance contracts and investment products, which may guarantee certain returns under certain circumstances but which do not – and actually

cannot - specify what will happen beyond the assumed scenarios. Furthermore, pension agreements often contain asymmetric claims, rights but without symmetric obligations, which are called embedded options. These options can be valuable in economic terms as e.g. the right to cut or limit inflation indexation of benefits, but is often unclear who has the right to exert this option and to whose benefit. Thus, in the Dutch context defined benefit pension promises are famously unfinished contracts clustered with embedded options (Kocken, 2006).

Germany shares with the Netherlands the basic legal construction of the pension fund as separate legal entity which acts as owner of the pension assets and guarantees the pension promise. Whereas the Dutch 'Pensioenfonds' are legally endowments, German 'Pensionskassen' are set up in the legal form of a life insurance company. Germany is the only country of the here analysed ones where fiduciary law does not explicitly apply to pension provision but some authors qualify insurance contracts as fiduciary contracts in principle (Löhnig, 2006) and we follow this view here. The above cited hybrid pension plan qualifies as an incomplete contract as well. In principal, German employers have access to the surplus of the pension fund also in an ongoing pension plan as long as all regulatory funding rules are fulfilled. The reality depends to some degree on the qualification of the pension plan by the accounting bodies. This seems to be a rather murky terrain: no clear rule was discernible during my expert interviews.

Confronting the continental European pension world with the Anglo-American experience we can summarise that in both the Netherlands and Germany the sponsor's access to the surplus is unrestricted. But as benefits are flexible in nature the surplus needs to be shared with pension plan members.

4.4.3. Behavioural implications of property rights

We will now summarise how the property rights defined by private contract and legal inheritance impacts the decision-making of pension funds managers. We concentrate on the salient features and do not attempt at covering all legal aspects.

The Anglo-American pension funds are governed by fiduciary principles which evolved and changed over times influenced by court decisions and legal interpretations[97]. Fiduciary law derives from the law of trusts. It comprises the two main principles duty of loyalty and duty of prudence. The duty of loyalty requires trustees to act in the best interest of beneficiaries. The duty of prudence requires trustees to act prudently, i.e. with skill, care and diligence. Although the United Kingdom and the United States share this common legal origin, encoding and practice of fiduciary principles which governs investment decision making developed differently over times.

With the passage of ERISA fiduciary duties were legally encoded in the United States. Furthermore, the US Department of Labor is responsible for the interpretation of ERISA's fiduciary law. US fiduciary law derives thus both from trust law and ERISA. ERISA demands trustees to invest with 'the care, skill, prudence and diligence under the circumstances then prevailing that a prudent man acting in like capacity and familiar with such matters would use in the conduct of an enterprise of a like character and with like

[97] Two major reports which focus on promoting sustainable investment but also analysed the legal aspects of fiduciary duty make an attempt at reconceptualising fiduciary duty in the modern context. The 'Freshfield Report' was authorized by the Asset Management Working Group of the UNEP Finance Initiative. A first report was published 2005 focussing on the 'legal framework for the integration of environmental, social and governance issues into institutional investment' in a number of countries followed in 2009 by a second report on 'fiduciary responsibilities'. The UK organisation FairPensions published a major report on investors' legal obligations in 2011.

aims' (ERISA § 404(a)(1)(B)). US law compares trustees' investment decisions to those of professionals thus requiring high level of investment skills. The principles of modern portfolio theory and professional investment management are central in the US prudent expert rule. The investment portfolio must be diversified; the investment strategy must be rational and appropriate for the pension funds. To ensure professionalism the responsibility for pension investment is placed with the employer. ERISA permits the employer to act both as plan sponsor and plan administrator thus creating a fundamental conflict of interest which general trust law forbids (Langbein et al., 2010). Recognising this conflict, company-appointed trustees are required to act in the interests of beneficiaries ('solely in the interest rule'). The US Department of Labor interprets this rule as not precluding the consideration of other interests as long as this is not detrimental to the interests of the beneficiaries thus legitimising the interests of the employer[98]. The careful interpretations indicate the difficulties inherent in fiduciary law which bears the analogy of walking a tightrope. Market practice in the United States closely aligns the interests of beneficiaries and sponsor. Although pension plans have their fiduciary boards and committees, there is 'no gap between the sponsor and the pension plan' according to a consultant, adding 'the pension plan is run by the company'. The company takes the decisions with regards to plan design, funding strategy and investment policy. Trustees can be expected to follow an active risk-adjusted return optimisation policy. The interests of the employer rank high. This structure incentivises high risk-taking.

The United Kingdom refrained from legally codifying fiduciary duty. There is no statutory definition of 'fiduciary duty'. The understanding comes from a case law back in

[98] See e.g the Advisory Opinion 98-04A, May 1998, on socially responsible investment, Available at: http://www.dol.gov/ebsa/programs/ori/advisory98/98-04a.htm, [accessed 01/06/012]

1886: 'The duty of a trustee is ... to take such care as an ordinary prudent man would take if he were minded to make an investment for the benefit of other people for whom he felt morally bound to provide'. Trustees are required to decide with 'reasonable care and skill' but no expert knowledge is required. Originally prudent investing was interpreted as cautious and conservative investing. This changed over time with the advent of modern investment theory and practice[99]. The Trustee Act (2000) formally recognised modern portfolio theory. But the traditional British practice of lay trustees did not promote expert knowledge at UK pension funds. Furthermore, following the Myners Report (2001) it was found bad practice to have the sponsor's CFO chairing the board of trustees. In response, the Pensions Act (2004) mandated that at least one third of trustees must be member nominated. The inherent conflict between expertise and representation was thus addressed as a problem of representation (Clark 2007a). Subsequently, TPR focussed on improving trustees' knowledge. We argue that the pension fund was removed from the sponsoring company. English law includes the plan sponsor in the beneficiaries. The interpretation of The Pensions Regulator sounds somewhat reluctant though:

A 'beneficiary' is anyone who is entitled to, or who might receive, a benefit from the scheme, now or in the future. Scheme beneficiaries can include:

- *active members – employees who are building up benefits in the scheme;*
- *pensioner members – people who are receiving a pension from the scheme;*
- *deferred members – people who have left the scheme, but who still have benefits in it (for example, because they have not transferred all their benefits to another pension arrangement);*
- *prospective members – people who, if they go on to meet the eligibility conditions, may be entitled to join the scheme at a future date;*
- *widows and widowers of members;*

[99] FairPensions (2011). 'Protecting Our Best Interests: Rediscovering Fiduciary Obligation'. Available at: http://www.fairpensions.org.uk/sites/default/files/uploaded_files/fidduty/FPProtectingOurBestInterests.pdf , [accessed 01/06/012]

- *dependants of members – for example, their children or other relatives who financially depend on them;*
- *former husbands and wives of members who, as a result of a court order on divorce (for example a pension sharing order) have been granted pension credits within the scheme; and*
- *in some circumstances the employer who, for example, may be able to receive a payment from the scheme if there is a funding surplus or when the scheme is wound up.*

Source: The Pensions Regulator

The recent governance changes in the United Kingdom enacted by The Pensions Regulator aimed at strengthening the independent position of the trustees and diminishing the sponsor's influence on the investment policy. Trustees are the agents of the beneficiaries meaning predominantly the members as can be seen from the above cited document. Role and duty of the trustees and their relation to the plan sponsor were last clarified by the Pensions Act 2004 and further detailed by the 'Codes of Practice' issued by The Pensions Regulator, the regulatory authority which was established April 2005 following the 2004 Pensions Act in succession to the Occupational Pensions Regulatory Authority (OPRA). The responsibilities of the trustees were clarified regarding the funding of the pension fund, the instances in which the agreement of the employer needs to be reached or where the employer is merely consulted and how to manage conflicts. In general, this opened a gap between the sponsor and the board of trustees, or as a former regulator put it, turned it into a *'proper arms-length relationship'*.

It is suggested that the changed governance rules imposed on pension funds by the Pensions Act 2004 and subsequent interpretations by the regulating authority significantly impacted the risk attitude of trustees at UK pension funds and their stakeholders. The trustees who are responsible for the investment decisions have in many

cases become significantly risk averse as they are not rewarded for risk-taking. Pension benefits are fixed by nature. Even though pension benefits can be increased this is not within the decision-making authority of the trustees but of the employer. In the current environment of mostly closed pension funds whose high funding deficits demand under current regulation eight times higher contributions than in the early 1990s (Keating, 2010), increasing benefits is not a plausible option. We suggest that safeguarding existing benefits has become the first priority for trustees. This involves a tendency towards low investment risk appetite even at the price of higher pension cost for the employer but while closely monitoring the sponsor's covenant. The employer is the residual claimant of a surplus resulting from expected higher investment returns that are the reward for higher risk-taking. Even though his property rights are restricted by his curtailed rights to actually recover the surplus, the employer benefits from lower contributions. The employer's interests are characterised by balancing lower pension cost versus higher pension volatility. But, as we discussed in section 3.3.2 and referred to again in section 5.4.6, the power of investments rests with the trustees and the sponsor's agenda needs to be brought to the negotiation table. From the perspective of the company, pension risk management is a core issue in managing the balance sheet, but one that is often difficult to influence (Blackwood, 2011). Closing pension schemes and transferring pension risk on the insurance market are measures of companies' pension risk management.

In the Dutch system pension funds are legally independent companies run by boards of trustees with equal participation of employers and employees. It is legally requested that the seats of employee representatives are allocated to active and retired

members basically proportionately to their numbers[100]. This legal stipulation renders the Netherlands the only country where retirees are represented in the pension fund's governing body. Starting from 2008, pension funds are requested to implement internal supervision by external experts either via a visitation commission or a permanent board (Stewart 2008). We take the view that the governance structure at Dutch pension funds does not discourage trustees form taking the degree of investment risk that they deem appropriate in the interest of active and passive plan members and the plan sponsor. The Netherlands is the only country of the here analysed ones which openly approves that trustees should also take the sponsor's interest into account when setting the investment policy. The pension fund is conceptualised as fiduciary of the beneficiaries and the employer thus extending the fiduciary duty to all stakeholders. As the pension benefits are flexible by nature and employers and members share the benefits of surpluses (as well as the adversities of deficits) the distribution of risk and reward is symmetric. The incomplete nature of the Dutch pension contract is found to be without consequences regarding the risk attitude of pension fund managers in general. This is notwithstanding recognising the governance implications of unclear pension deals as the absence of clear agreements of how to distribute risk and reward between the stakeholders obscures the goals for pension managers thus impairing their ability to choose the appropriate investment strategy (Ambachtsheer et al., 1998).

The German 'Pensionskasse' is run by a management board consisting of at least two managing directors supervised by the supervisory board with equal representation of employers and employees. The senior representative body is the assembly of members.

[100] Pensions Act, Article 99-101, Available at: http://www.dnb.nl/openboek/extern/file/dnb_tcm41-163841.pdf , [accessed 01/06/012]

The memorandum and articles of the association specify how these bodies are established[101]. According to interviewees the supervisory board is usually responsible for setting the strategic investment policy, the management board for its implementation. The legal construction of 'Pensionskasse' as insurance company does not discourage risk taking. The traditional single-company 'Pensionskasse' is a member mutual insurance company established as a welfare institution to improve the social welfare of its members. But the interest of the sponsor is not legally denied either. In practice, the sponsor has extensive decision-making authority. Depending on the chosen legal profile of the 'Pensionskasse' (for detail see section 5.2.4) the sponsor is the residual claimant legally entitled to recover the surplus. We would expect investment strategies consistent with financial-economic rational. We argue that the asymmetric risk-reward distribution of hybrid pension plans renders the decision-making process risk-diffuse and the strict regulations further turn the decision-making towards risk-averseness.

4.4. Conclusions

This chapter researched the interaction between patterns of governance and the risk-taking of corporate-sponsored defined-benefit pension funds in Germany, the Netherlands, the United Kingdom and the United States. The results of this chapter confirm that governance matters for investment decision-making. Delegated decision-making is characteristic of pension funds thus establishing a principal-agent problem. We defined the agency relationship at DB pension funds in the sense that pension fund managers make decisions on behalf of the members of the pension plan and the sponsoring employer for the purpose of providing benefits to their members at reasonable

[101] Bundesanstalt fuer Finanzdienstleistungsaufsicht, Act on the Supervision of Insurance Undertakings (Insurance Supervision Act - VAG), Available at: http://www.bafin.de/gesetze/vag_en.htm#top, [accessed 01/06/012]

expenses. We thus introduced two main principals to this agency relationship, namely sponsor and members. We further outlined that the risk attitude of these two main principles differs and can become conflicting under certain circumstances. Generally, we assume the employer to be less risk-averse than the employees. Recourse to the sponsor and recovery of surplus are seen as the two most important factors influencing the risk attitude of the principals. Risk-neutrality is given if the risk-reward-situation is neutral. This is the case if either the employer can recover the surplus and has to cover deficits of the pension fund or if the pension fund has no recourse to the sponsor and the employer cannot recover a surplus. The distribution of risk and reward between the principles constitute property rights which are specified by the private contract detailing the pension promise and are further embedded in national pension law. We recognised that especially in continental Europe the pension contract qualifies as an incomplete contract as benefits are flexible by nature. But according to our findings the hierarchy of the principles for the decision-making agents finally determines the risk attitude of the agents.

Chapter 5: Evidence from four countries

5.1. Introduction

This chapter aims at giving an overview of the different employer-sponsored DB pension fund systems in Germany, the Netherlands, the United Kingdom and the United States. Each section starts by giving a short overview of the main characteristics of the pension fund market, followed by chapters on the funding status, governance structure,

pension plan design and regulation. Finally, it is analysed how these factors impact investment strategies and risk management.

5.2. Germany

5.2.1. Context

The German market for occupational pension provision amounted to EUR 468bn in 2009 (Schwind, 2011), which renders it by far the smallest of the four analysed countries. But the German Pension Reform, which was implemented from 2002 onwards, seems to have succeeded in enhancing the relative importance of occupational pension provision for total old age income thus compensating the reduction in the state-provided pension benefits. Not yet clearly noticeable in the volume of invested pension assets, the proliferation of occupational pension increased from an estimated 52 percent in 2001 to 65 percent of employees in the private and public sector in December 2006[102].

For Germany, this research focuses on 'Pensionskasse' only, as this is the most relevant and best documented funding vehicle in Germany: 150 'Pensionskasse' managed assets of EUR 116bn in 2011[103]. The reader should bear in mind that the 'Pensionskasse' is just one in five available vehicles and accounts for about a quarter of the German market for occupational pension provision. The 'direct pension promise', where the pension liability was traditionally not separately funded and pension benefits were paid from the sponsoring company's cash flow, is still the dominating vehicle accounting for over 50

[102] TNS Infratest Sozialforschung, 2007: http://www.bmas.de/coremedia/generator/952/property=pdf/2007__07__03__situation__und__entwicklung__bav__2006__endbericht.pdf [accessed 26/06/2012]. A new survey on recent developments has been commissioned and is forthcoming 2012.

[103] Bundesanstalt für Finanzdienstleistungsaufsicht, Jahresbericht 2011, Available at: http://www.bafin.de/SharedDocs/Downloads/DE/Jahresbericht/dl_jb_2011.html , [accessed 26/06/2012]

percent of occupational pension provisions. These 'direct pension promises' are nowadays increasingly funded: Companies irrevocably dedicate assets to the pension liabilities, in order to avoid having what accountants term 'unfunded pension liabilities' on their balance sheet. But companies usually do not use one of the existing regulated vehicles for that purpose but establish so-called 'Contractual Trust Agreements' (CTA), which are purely legal structures, unconnected to occupational pensions and therefore not regulated by the German pensions regulator. There is no official statistic on the use of CTA's, but building on companies' announcements it could be very roughly estimated to have about the same volume in terms of assets under management as the 'Pensionskasse'. This implies that two pension-fund like structures exist in Germany, one whose investment is heavily regulated, and one with completely unregulated investment and risk management[104]. Comparative research into companies' decision-making regarding the choice of the funding vehicle and also the decision-making in these vehicles could provide valuable insights into the impact of regulation, but is beyond the scope of this research.

5.2.2. Funding Status

As German pension funds are legally prevented from building up a high equity exposure and are requested to be well funded, they are comparatively well shielded from the negative impact of an equity market downturn compared e.g. to the United Kingdom. Although some company-sponsored 'Pensionskasse' were hit hard during the 2000-2003 crash due to asset losses, the subsequent fall in bond market yields lowering the returns

[104] The youngest funding vehicle, the 'Pensionsfonds', which was introduced with the German Pension Reform in 2001, and which combines features of both vehicles as it is an insurance-like structure with mostly unregulated investment management, has just recently been chosen for funding pension liabilities by large German companies due to mostly legal problems.

on the dominating fixed income portfolio in many cases below the absolute return requirements is for many 'Pensionskasse' a more urgent challenge they had to cope with. In its annual report 2011 the German regulatory agency qualified German pension funds as being in stable financial condition. Hidden losses that occurred at a number of pension funds in the aftermath of the 'perfect pension storm' were regained. But regulation prevented many pension funds from benefitting from the favourable stock market trends from 2003 onwards thus limiting the return potential. Thus, the exposure to 'risk assets' was restricted, what in turn rendered the impact of the 2007/2008 crisis less severe.

5.2.3. Governance Structure

A 'Pensionskasse' is organised in the legal form of an independent life insurance company. It can serve one or more employers. Traditionally, 'Pensionskasse' were operated by the sponsoring company or groups of companies. More recently, following the German Pension Reform in 2001, also financial service providers started operating 'Pensionskasse' on a for-profit basis. Also, trade unions and employer associations mostly established 'Pensionskasse' as vehicle for the industry-wide pension provisions, which were established following the new German pension law. In terms of assets under management, company 'Pensionskasse' dominate the market. They are usually organised in the form of a member-mutual society. Insurance law regulates the necessary bodies: The 'Pensionskasse' is run by a management board consisting of at least two managing directors supervised by the supervisory board with equal representation of employers and employees. The senior representative body is the assembly of members. The memorandum and articles of the association specify how these bodies are

established[105].The supervisory board is usually responsible for setting the strategic investment policy, the management board for its implementation. German 'Pensionskasse' operate as professional pension fund management companies, with a full staff managing in-house pension administration, investment, risk management and reporting. The influence of consultants is therefore relatively low. The large 'Pensionskasse' manage the complete pension investment process including manager selection in-house. Most 'Pensionskasse' pursue a mix of in-house and outsourced investment: Bond investment is mostly done in-house, whereas more research-intensive asset classes as for example emerging markets are outsourced to external investment fund managers. The exact apportioning is closely linked to the size of the pension fund.

In 2010, we found very different models regarding the degree of separation between the sponsor and the 'Pensionskasse'. Some companies operate their 'Pensionskasse' as in-house undertakings from their finance and human resources departments. In these cases, the sponsoring company is strongly involved in the decision-making on the strategic investment policy, they set the guidelines. As a pension consultant put it: 'In Germany, it is difficult to distinguish between the company and the trustees'. In this model, there is strong involvement and commitment of the company. Companies are usually more inclined to take investment risk in their 'Pensionskasse'.

Other companies seek greater separation from their pension funds. Especially when the sponsor disintegrates into a fragmented group of companies on the market for corporate control, the 'Pensionskasse' can become a truly independent company and

[105] Bundesanstalt fuer Finanzdienstleistungsaufsicht, Act on the Supervision of Insurance Undertakings (Insurance Supervision Act - VAG), Available at: http://www.bafin.de/gesetze/vag_en.htm#top, [accessed 26/06/2012]

might also be opened to for-profit third party business. The 'Pensionskasse' can be operated as a core business of the company group with a risk and return budget set by the mother company. In this case, regress to the sponsor's covenant is still a legal provision but not any longer a relevant option for the pension fund's strategic policy.

The legal construction as an insurance company as such does not discourage risk taking of 'Pensionskasse'. Insurance law is silent on the question of whose interests the managing board has to take into account in its decision-making. But the construction of the traditional company pension fund as a member mutual welfare institution which is subject to German co-determination safeguards the interests of the plan members.

5.2.4. Pension Plan Design

German pension plans are mostly hybrid. Pure DC plans are legally not permitted[106] , pure DB plans are becoming increasingly rare. The dominating plan type for new contracts is a 'contribution orientated' DB plan ('Beitragsorientierte Leistungszusage'), which is quite close to the cash balance plans in the US. It is basically an average salary plan, where the employer guarantees a pension benefit based on fixed contributions. The pension benefit is calculated according to actuarial rules. As the calculation of this pension benefit is based on very conservative estimates, the promised pension benefit is actually a minimum benefit, which usually gets topped up by surplus benefits. In general, benefits must be indexed in Germany. Every three years, the employer must check, if the purchasing power of the benefit is still in line with the originally promised benefit and, if necessary and economically viable for the sponsoring

[106] The employer is legally required to guarantee at least the accumulated contributions as pension benefit to the employee as a minimum protection against investment risks. This guarantee is also often referred to as 'zero-interest-rate-guarantee'.

company, adjust the benefit in line with the increase of the consumer price index or net wages. Alternatively, the employer can increase the pension benefits automatically by 1 percent per year. The 'Pensionskasse' can exempt from the indexation rules, if all pro rata surpluses are used to increase the benefits of the pensioners.

Like life insurance companies, 'Pensionskassen' guarantee a fixed minimum rate of return per annum on the paid in contributions during the accrual phase. 'Pensionskasse' generally determine the level of guaranteed interest rate up to a cap, which is fixed by the Ministry of Finance in relation to the yield of long-term Government bonds (1.75 percent since January 2012). The guaranteed interest rate applies for the entire life of a contract. This maximum interest rate guarantee was subsequently lowered over the last years following the decline in market rates. But as this applies for new contracts only, many 'Pensionskasse' still have contracts in their books with guaranteed returns of 4 percent per annum or more. The average guaranteed return was 3.5 percent 2011 according to the German supervisor. The liabilities of 'Pensionskasse' therefore follow long-term bond-yields, but - given the long-term nature of pension contracts - with a significant time-lag. The total pension benefit paid by a 'Pensionskasse' to its pensioners consists of the guaranteed benefit and the surplus benefit, which depends mainly on the return of investment.

The second new plan type, which was introduced in 2001, is a DC plan with additional guarantees for the employee ('Beitragszusage mit Mindestleistung'). The investment risk is shared between employer and employee, as the employee is sheltered by a nominal guarantee of the contributions paid in (less disbursements for the cover of biometric risks). Here, indexation of benefits is not required.

Quite often, the pension plan includes options regarding the level of required contributions and/or guaranteed benefits. The ‘Pensionskasse’ can then either increase contributions or decrease benefits in case of severe economic problems. Today, most ‘Pensionskasse’ offer a variety of pension plans with different benefit structures employers and/or employees can choose from.

The managing board of the ‘Pensionskasse’ is responsible for the accounts of the ‘Pensionskasse’ which need to be audited. As most smaller German companies also ‘Pensionskasse’ are subject to the accounting rules detailed in the German Commercial Code (‘Handelsgesetzbuch’, HGB) whereas large plan sponsors have to apply IFRS accounting. HGB accounting is based on nominal values. There is no easy and clear rule on how to replicate the ‘Pensionskasse’ in the sponsor’s accounts. Even the interviewees, rock solid on all aspects of ‘Pensionskasse’, displayed a certain degree of confusion and uncertainty regarding the treatment of ’Pensionskasse’ in the sponsors’ balance sheet. The market practice we checked showed significant variance. The first question arises whether the ‘Pensionskasse’ belongs to the group of to be consolidated companies for the sponsor. The next question is whether it has to be accounted for as DB or DC. The answers depend partly on the legal construction of the ‘Pensionskasse’, partly on the typology of the pension plan and is further a case-by-case decision. Occupational pension benefits provided via the traditional single-employer ‘Pensionskasse’ can be either DC or DB in the sponsors’ IFRS accounts. When the ‘Pensionskasse’ provides benefits under the ‘contribution orientated’ DB plan and the company can recover surpluses, then the sponsor has to acknowledge a DB pension promise in its balance sheet. The ‘Beitragszusage mit Mindestleistung’ may be qualified as DC plan by the auditors if the returns remain within the ‘Pensionskasse’ and are thus owned by the members. The new

multi-employer or industry-wide 'Pensionskasse' are generally treated as DC plans in the sponsors' accounts. So while in general companies are legally allowed to recover surpluses of 'Pensionskasse' – and cover deficits in return – companies may opt to waive this right. On the other hand, companies cannot be legally released from the obligation to cover deficits as this is grounded in the law of occupational pension provision (Höfer, 2011). The probability of shortfall may be minimised but a subsidiary liability remains.

5.2.5. Regulation

German pension funds are regulated and supervised by the insurance division of the Federal Financial Supervisory Authority ('BaFin'), which operates since 2002 as integrated supervisor for banks and financial service provider, insurance companies and securities trading. The 'BaFin' pursues a risk-orientated regulatory approach. German 'Pensionskasse' are subject to strict funding rules. 'Pensionskasse' must be constantly funded at 104.5 percent of its technical reserves, it is technically insolvent at a funding level below 100 percent. At funding levels below 104.5 percent, a recovery plan has to be prepared and approved by the regulator.

'Pensionskasse' are discouraged from risk-taking. First priority is given to the safety of investments. Pension funds are legally prevented from investing in assets which are rated by the large rating agencies below investment-grade[107]. The regulator's investment principles further demand investments to yield a positive rate of return, to be liquid, and to be well diversified by asset class and debtor. The investment principles are

[107] Long-term ratings of at least BBB- by Standard & Poor's and Fitch or Baa3 by Moody's and short-term ratings of minimum or above A-3 by Standard & Poor's, F3 by Fitch, or Prime 3 by Moody's are classified as investment grade. As an exemption of this rule, 'Pensionskasse' may invest in high-yield- bonds which are rated at least 'speculative' with a rating of B- by Standard & Poor's or B3 by Moody's up to 5percent of their assets.

outlined by law ('Versicherungsaufsichtsgesetz') and detailed by 'circulars' which are decreed by the regulator. These 'circulars' are legally binding.

German 'Pensionskasse' are the only pension funds (of the here analysed countries), which must adhere to quantitative investment rules[108], which are applied in two steps. First, the regulator defines the investment universe by specifying the asset classes 'Pensionskasse' are allowed to invest in. Market participants criticised the regulatory authority for reacting too slowly to market innovations thus preventing 'Pensionskasse' from capitalising on first-mover opportunities. For example, investments in hedge funds were allowed only in 2004 with a limit of 5 percent of total assets ('Sicherungsvermoegen'). While Anglo-American and Dutch pension funds started investing in commodities a few years ago, this was allowed to German 'Pensionskasse' in 2010 only.

Second, the regulator imposes limits in relation to the assets under management for the maximum investment per asset class or group of asset classes, thus legally prescribing and to a certain extent detailing the diversification principle which is central to modern investment theory. The most important quantitative investment limit is the general quota of maximum 35 percent 'risk-taking assets'. 'Pensionskasse' may invest up to 35 percent of assets in so-called 'risk-taking assets' which comprises asset classes with as highly diverse risk profiles as listed equity, hedge funds and high-yield investments. The pension fund's individual risk taking capability determines the extent to which investments in risk-taking assets are regarded as suitable, which in turns depends on the

[108] Circular 4/2011 (VA)' Guidance Note on the Investment of Restricted Assets of Insurance Undertakings', issued by BaFin regulates pension funds' investments. Available at: http://www.bafin.de/SharedDocs/Veroeffentlichungen/DE/Rundschreiben/rs_1104_va_anlagers.html , [accessed 26/06/2012]

extent of reserve buffers or the implementation of hedge strategies. In this respect, German regulation is case-based and risk-orientated.

Further quantitative investment rules include the postulation that not more than 5 percent of the portfolio may be invested with the same debtor. This quota increases to 30 percent in case of German public authorities, international organisations and qualified banks. Investments in currencies other than the Euro are closely limited as, firstly, at least 80 percent of the assets must be invested in the same currency in which the liabilities are denominated, and, secondly, assets have generally to be invested in the same country where the liability was generated.

All quotas are calculated on nominal or book-value basis. German 'Pensionskasse' must apply the accounting rules detailed in the Third Book of the Commercial Code (Handelsgesetzbuch, HGB). For an overview of the German accounting system see e.g. Harris et al. (1994). The HGB principle 'lower of cost or market rule' is grounded in the principle of imparity and qualifies thus as conservatism principle as outlined by Basu (1997): 'Bad news' are reflected more quickly than 'good news'. The majority of German companies, which are not subject to international accounting rules of IFRS, are required to recognise unrealised losses but not unrealised gains. Initially requested to be followed in its strict form, 'Pensionskasse' were allowed to keep a higher book value if the reduction in market values is only temporary following the stock market crash 2000-2002 (§66 VAG).

Thus regulatory accounting rules allow the building up of hidden reserves and hidden losses thereby allowing for a more stable investment policy as the portfolio does not need to be rebalanced following capital market volatility. The German regulator has

not (yet) followed the international trend towards fair value accounting, apart from some reporting requirements. The – compared by international standards – rather low 35-percent-quota for risk-taking assets has to be judged in this light: In phases of strong equity markets this allows for an equity exposure of up to 50 or 60 percent in fair value terms which brings it more in line with international practice.

These investment regulations impact the funding cost of pension plans not only by directly setting a risk limit but also by reducing the variety of available asset classes thus limiting possible investment strategies as well as by reducing the time horizon of investment.

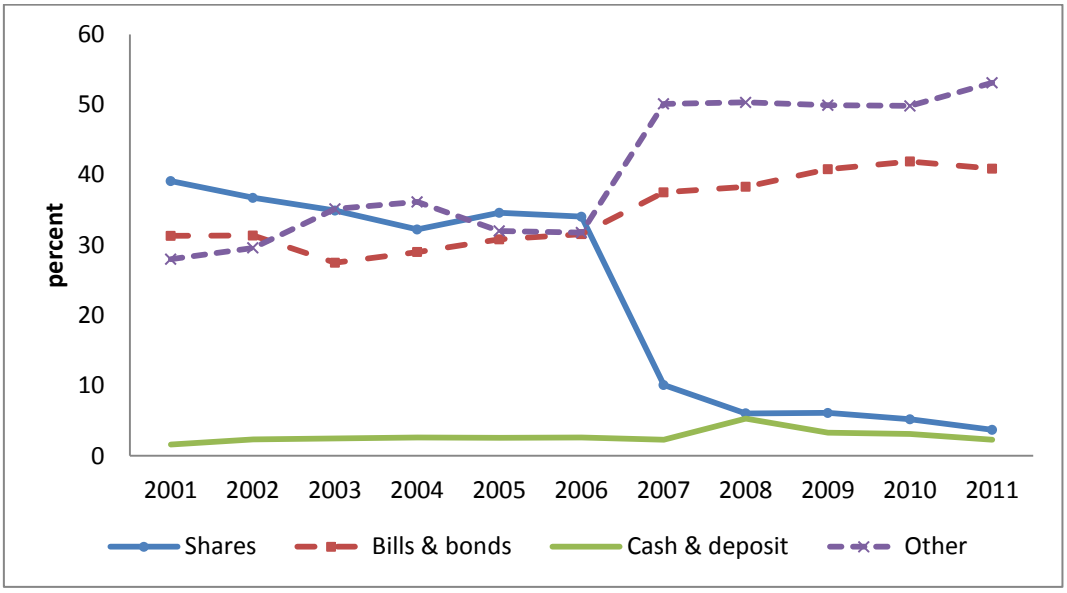
5.2.6. Investment Strategies

As German regulation is very strict on funding, the primary investment goal is to avoid shortfall risk in the funding level. As liabilities are evaluated at a fixed discount rate which is also the guaranteed rate of return on contributions, assets have to grow at least at the same pace to keep the funding level in line. Therefore, 'Pensionskasse' pursue an absolute return target as secondary investment goal. '3.5 percent + x' represents a commonly formulated investment goal, with the 3.5 percent being the prevailing discount rate, the 'x' resulting from the regulator's demand to increase capital and from the need to enhance mortality.

German 'Pensionskasse' are conservative and risk-averse investors. The maximum investment limit of 35 percent for 'risk-taking assets', e.g. equity, profit participation rights or hedge funds, was used to only 11 percent in 2011 compared to 18

percent in 2005[109]. Equities are the main source of risk-taking assets. Hedge funds added 0.6 percent-points and high-yield investment 1.8 percentage points to the risk-quota. Most of the hedge funds investment constitutes indirect investment via structured products with the return linked to underlying hedge funds. It can be concluded that portfolios have been further de-risked and only reluctantly diversified into alternative assets.

Figure 5.1: Pension fund asset allocation for selected investment categories: Germany



Source: OECD GPS (for methodology please see also table 3.1)[110]

The investment behaviour of 'Pensionskasse' is similar to that of life insurance companies, which is not surprising given the identical legal structure and regulation. The traditional investment strategy is to pursue a buy-and-hold strategy with registered, not-quoted bonds or loans issued by banks or the Government which are valued at face value.

[109] Bundesanstalt für Finanzdienstleistungsaufsicht, Jahresbericht 2011, Available at: http://www.bafin.de/SharedDocs/Downloads/DE/Jahresbericht/dl_jb_2011.pdf?__blob=publicationFile&v=4 , [accessed 26/06/2012]

[110] Germany changed the reporting methodology in 2007. The high value of the category 'other' is mainly driven by loans and other mutual funds.

It is regarded as a low-risk strategy, as losses on the balance sheet that would incur to quoted bonds in times of rising yields as bond prices fall can be avoided. The 'lower of cost or market rule' as outlined in section 4.2.5 demands quoted bonds to be depreciated as market prices fall but this does not apply to registered, not-quoted bonds. This investment strategy makes sense only in the nominal value orientated German regulatory context. Of the in this research analysed countries, German pension funds are the only ones which still apply nominal values to assets and a fixed discount rate to the liabilities. This valuation methodology smoothes out capital market volatility in a way which is comparable to the traditional actuarial approach common in the Anglo-American countries. But it is widely criticised by consultants and investment bankers for being a low-yield strategy. Implementing core-satellite strategies is the first step out of the traditional investing, thus benefiting from the positive diversification of assets with low correlations. The dominating asset class is clearly fixed income; only the larger and more sophisticated 'Pensionskasse' have started to invest in alternative asset classes, such as hedge funds and private equity. Liability immunising strategies are not common in Germany.

A common investment approach is to stay in the fixed income investment but to enhance yield by buying into structured products, which are synthetic investment instruments created by investment banks. The kind of investments that appeal to 'Pensionskasse' usually uses bonds as underlying combining them with derivatives thereby creating bond-like instruments with returns higher than bonds or with cash-flows that better match the investor's cash need. Examples are multi-callable bonds, which offer a higher return in exchange for a cash-flow risk or reinvestment risk. 'Pensionskasse'

invest in structured products within their strategic bond allocation. It can amount up to 25 percent of the overall portfolio.

Some 'Pensionskasse' had also started to invest in collateralised debt obligations (CDO). Their charm is, as one market participant put it 'to offer the return of equity at bond-like volatility'. This is an indication of regulation-induced sub-optimal investment. Prolonged periods of falling interest-rates pose a dilemma for 'Pensionskasse': In order to fulfil their pension obligations they need annual investment returns at or above the guaranteed return, which has been significantly above the risk-free return of long-term government bonds. This implies the need to take investment risk. But as they are prevented from openly taking investment risk by investing in highly liquid equities priced on public stock exchanges in a transparent and competitive way, they are incentivised to capture risk premiums in a more discreet way by investing in asset classes which are either illiquid or with opaque pricing mechanisms or both.

All but one interviewee stated that their investment portfolio would look differently in the absence of regulation. Most would like to have a higher exposure to equities, all would like to be able to react earlier to new investment topics. Depending on the individual specifications of the pension fund regarding maturity of plan population or regress to the sponsor's covenant, pension funds would not necessarily take more risk but would take risk from different sources in a way they deemed to be more efficient. This contrasts sharply with the responses from pension funds from the other analysed countries, which all stated that regulation had either none or very little influence on their investment decisions. The strong influence of regulation in Germany was emphasised by one market participant with the comment: 'When you make an investment-decision, the

first question you ask is: "Is this compliant with regulation?" The investment-related questions rank actually second'.

5.2.7. Risk Management

In Germany, risk-management is outlined by the regulatory authority in some detail. Risk management is clearly regulation driven. The requirements pension funds have to meet include requirements regarding

- Asset-Liability-Management
- Stress-test
- Internal organisation and revision.

With the 'circular 15/2005', Asset-Liability-Management (ALM) became implicitly legally required. The circular states that insurance companies (including pension funds) have to decide on their strategic asset allocation within the specific context of their liabilities. A detailed analysis of the risks involved in assets and liabilities and their relation (ALM) is therefore an important precondition for the formulation and implementation of the investment policy. The ALM studies have to stress-test the investment policy in a range of different capital market scenarios. Methodology, assumptions and results have to be reported to the regulator[111].

The most important risk management tool is the stress test imposed by the regulator, which is basically a tool to analyse the impact of negative developments of capital markets on the portfolio with a one-year horizon. The 'BaFin' conceptualises the stress-test as an important quantitative risk management instrument which acts as early-warning system. The stress-test questions if the pension fund still fulfils the solvability

[111] Bundesanstalt für Finanzdienstleistungsaufsicht, Rundschreiben 15/2005, Available at: http://www.bafin.de/rundschreiben/89_2005/050820.htm. [accessed 26/06/2012]

requirements, i.e. funding level above 100 percent, in certain pre-defined negative scenarios for equity and bond markets. The 'Pensionskasse' must pass the stress-tests, otherwise the regulator could demand changes to the investment policy or even close the pension fund. The stress test was introduced in 2002 in reaction to the first financial crisis and extended over the years. Since 2006, 'Pensionskasse' must meet four different stress tests, including one on equity and property combined. The parameters are not fixed but determined by 'BaFin' according to market conditions. The four tests as applied in 2011 are specified in table 5.1:

Market participants cited the stress-tests as the main reason why the quota of 35 percent for 'risk-taking assets' never gets fully tapped. It shortens the investment horizon of 'Pensionskasse' to a period of one year maximum und thus prevents German pension funds from benefiting from the opportunities of long-term investing. It is a pro-cyclical tool as cyclical downswings in the equity market can force pension funds to sell equity in order to pass the stress-test instead of benefiting from the opportunity volatility offers to long-term investors. Especially in the aftermath of the 'perfect pension storms' when hidden reserves were exploited and often turned into hidden losses, many pension funds were rumoured to have been forced to sell equities, thus realising losses.

Table 5. 1: Stress-test of the German pension regulator

Stress-test	Asset class	Market value
A 35	Equity	-20%
R10	Bonds	-10%
RA25	Equity,	-15%
	Bonds	-5%
AI28	Equity,	-20%
	Property	-10%

Source: Bundesanstalt für Finanzdienstleistungsaufsicht

Furthermore, the regulating authority details internal operation and control and revision processes, also specifying which actors at the pension funds are responsible for which tasks. This prompted large 'Pensionskasse' to compile detailed 'risk management handbooks' outlining the complete risk management process from the ALM to the reporting. The circular on the regulatory requirements on risk management[112] was further updated in January 2009 implementing the recommendations of the Financial Stability Forum (FSF) and antedating the qualitative risk management requirements of the upcoming insurance regulation Solvency II.

Regulation thus firmly anchored ALM in the German market. ALM studies are usually conducted by consultants. Large 'Pensionskasse' have started implementing own

[112] Rundschreiben 3/2009 (VA) - Aufsichtsrechtliche Mindestanforderungen an das Risikomanagement (MaRisk VA), Available at: http://www.bafin.de/SharedDocs/Veroeffentlichungen/DE/Rundschreiben/rs_0903_va_marisk.html, [accessed 26/06/2012]

ALM tools not only for deriving the SAA but also to simulate pension policy decisions in a way that is comparable to the market practice in the Netherlands. But in many cases ALM studies lack sophistication. The gap between the leading and the lagging pension funds seems to be quite high. Therefore, it is not surprising that some market participants describe the stringency between the ALM study and the decision-making as relatively low, whereas other pension funds cite ALM as the most important strategic management instrument. Risk budgeting is not common in Germany.

5.3. Netherlands

5.3.1. Context

The pension fund market in the Netherlands is one of the largest in the world, in absolute and even more so in relative terms compared to GDP. At the end of 2011, assets of Dutch pension funds were estimated at EUR 870bn[113]. According to the OECD, the asset-to-GDP ratio for pension funds amounts to 135 percent, thus underlining the high importance of pension funds in the Netherlands[114]. In 2011, 790 pension schemes provided pension benefits, thereof 123 industry-wide pension funds, which are mostly mandatory for the employees in a specific industry, 652 company pension funds serving the employees of a single employer, and 15 occupational pension funds, which cover the members of specific professions[115]. The industry-wide pension funds dominate the market holding 70 percent of all pension assets and covering approximately 85 percent of active members. For a good overview of the Dutch pension system see e.g. Ponds and van Riel

[113] De Nederlandsche Bank, Pension schemes), Available at: http://www.statistics.dnb.nl/index.cgi?lang=uk&todo=Pen1 , [accessed 20/06/2012]
[114] OECD, Pension markets in Focus, Available at: www.oecd.org/daf/pensions/pensionmarkets , [accessed 20/06/2012]
[115] De Nederlandsche Bank, Pension Schemes, Available at: http://www.statistics.dnb.nl/index.cgi?lang=uk&todo=PenRegel , [accessed 20/06/2012]

(2007). The two largest pension funds, ABP, the pension fund for the public sector (privatised in 1996), and Pensioenfonds Zorg en Welijn (PfZW)[116], which covers the employees in the healthcare and social work sector, alone account for about 40 percent of the Dutch pension fund market, with accumulated assets of EUR 261bn and EUR 116bn respectively spring 2012. Apart from these giants, the market is rather fragmented. Since the early 2000s there is considerable market consolidation; the number of pension funds nearly halved. Increasingly, company pension funds are bought-out by insurance companies or merge with other funds. To enlarge the scope for mergers between company pension funds and so ultimately enhance benefits of scale, multi-company funds were legally introduced in 2010.

5.3.2. Funding Status

The financial position of Dutch pension funds remained strained throughout 2010 and 2011. Nominal funding ratios recovered from their 2008 lows, when funding ratios for the whole industry plunged on average to 95 percent at the end of 2008 compared to 144 percent a year earlier. Real funding ratios, which take account not only of the guaranteed benefits but also of the aspired inflation-indexation of benefits, remained significantly below 100 percent.

Thus, the 2007/2008 crisis impacted the funding status of Dutch pension funds more severely than the 'perfect pension storm' from 2000-2003. With a decline of assets of close to 9 percent in 2008 the asset side did not fare much worse than in the previous crisis. Funding ratios were more significantly hit by liabilities with technical provisions soaring by 25 percent at end 2008 compared to 2007. The application of the fair value

[116] ABP and PfZW both separated the pension fund from the administrative organisation in 2008.

principle on pension funds' liabilities for regulatory purposes accounts for the main difference in the impact of both crises. The widening interest rate spread between government bonds and the swap curve on the one hand and corporate yields on the other hand resulted in additional funding shortfalls of Dutch pension funds compared to their British and US counterparts.

Since the 2007/2008 crisis, the financial viability of Dutch pension fund is under scrutiny and regulatory reform under way.

5.3.3. Governance Structure

Dutch pension funds are legally independent companies run by boards of trustees with equal participation of employers and employees. Company pension funds have sometimes also pensioners sitting on the board. The governance structure at Dutch pension funds is changing: The introduction of members' councils and separate supervisory committees changes the structure of internal supervision. New legislation is underway.

For the time being, the governance structure at Dutch pension funds does not discourage trustees form taking the degree of investment risk that they deem appropriate in the interest of active and passive plan members and the plan sponsor. Required by law, there are clear agreements in place how to share risk and return, how to use higher than expected investment returns to either improve the benefits for the members or reduce the funding cost for the sponsor, and the other way round, how to distribute the burden in case of lower than expected investment returns. A 'policy ladder' may state that pensions are fully indexed when the fund fulfils the solvency requirements at a level of around 130 percent, that pensions are only partly indexed when the solvency level falls to below 130

percent and that indexing stops at 105 percent, which is the minimum level. Below 105 percent a recovery plan is legally required which usually includes an agreement with the sponsor to increase contributions, and above a funding level of e.g. 150 percent the sponsor might benefit from a reduction in premiums or – as a next step – benefit from the restitution of the surplus, which is legally allowed in the Netherlands.

Still, pension fund governance came under scrutiny for lacking clear communication to the members, after the unprecedented step by a number of pension funds to reduce benefits in payment arouse wide public attention (van der Mei,j 2011).

5.3.4. Pension Plan Design

Pension plans in the Netherlands overwhelmingly maintained the DB structure while adopting DC elements. In the early 2000s, most plans changed from the traditional final salary plan to average salary plans. Final salary plans provide automatic wage-indexing, which is usually close to inflation-indexing, of pension accruals as pension entitlements are linked to the number of years in service and the 'final' salary. In an average salary plan, pension accruals are linked to the annual salary earned in each year of service. Inflation-indexing of pension accruals is an explicit goal of pension funds' policy, but conditional on the financial position of the fund. This relates to the sharing of investment risk between employer and employee. Average salary plans therefore combine elements of DB and DC plans. The change to average-salary plans with solvency-contingent indexation provided Dutch pension plans with a second policy instrument besides the contribution rate. It can be seen as a real option, enhancing flexibility. This flexibility allows pension funds to better cope with external shocks. As one market participant put it: 'Flexibility keeps the system alive'. Conditional indexing thus becomes

a powerful policy instrument. Solvency risk management was expected to increase significantly (Ponds 2009).

The next step was the change to 'Collective Defined Contribution (CDC) Plans'. Under a CDC plan, the contribution is fixed over a time horizon of 5 to 10 years. The contribution level is set higher than what would be needed under a DB plan to include a risk buffer. The employer can no longer be made liable for shortfalls, but is not able to recover surpluses either. Basically, the employer opted out of the risk sharing mechanism of a DB pension fund. The pension fund renounces 'the use of the contribution rate as a risk-steering instrument' (Ponds and van Riehl, 2007). Under a CDC arrangement the intergenerational risk sharing between active and passive members is at the core of the system. Risk is shifted from the active workforce to pensioners. Following the huge funding gaps in the wake of the GFC in the late 2000s, pension funds responded with suspending indexation of pension benefits; in some spectacular cases pension funds had to announce a reduction of member's accrued rights and benefits, pensions in payment will be cut from April 2013 – if the financial position of the pension funds does not improve sufficiently (van der Meij, 2011). The level of pension entitlements became the main shock absorber. The Dutch risk-sharing mechanism was 'stress-tested' and found insufficient (Kortleve and Ponds, 2010). The reduced risk-bearing capacity of pension funds was – among others – criticised in the Frijns-Report (2010), triggering legislative reform.

5.3.5. Regulation

A general pension reform is underway in the Netherlands. The social partners signed a new pension deal in June 2010 which is now getting legally implemented. This

also requires adapting the regulatory framework for pension funds. Following public discussions, minor rather than grave changes are expected[117].

Dutch regulation is traditionally funding orientated. In the absence of a pension insurance fund, the safety of the pension fund system is based on the solvency of the pension funds. In 2007, the Dutch Central Bank (DNB)[118] which acts as the prudential regulator for the financial situation of the pension funds, imposed an entirely new regulatory system, which is a risk-based approach based on the fair value principle, which applies to both pension funds and insurance companies, albeit with some differences.

Dutch regulation fully applies the fair value principle in regulating pension funds. Pension funds assets and liabilities are valued in a consistent way, thus exposing both sides of the balance sheet to capital market risk. Only the contribution rate can still be calculated based on a fixed discount rate of 4 percent to counter undesirable volatility of the contribution rate.

The new regulatory approach was under discussion for a long time. The basic principles of the Financial Assessment Framework (FTK) were already outlined in 2001 by the Pensioen- & Verzekeringskamer, the predecessor of the DNB. 'On the basis of generous external feedback and progressive internal insight, work continued on the substance and the practical implementation of the FTK with, of course, strong input from the international dimension (IASB-IFRS, the Solvency II project and the Basel II Capital

[117] See e.g. http://www.ipe.com/news/dutch-pension-funds-can-use-outline-of-pensions-act-when-weighing-rights-cuts_43912.php , [accessed 20/06/2012]

[118] Dutch Pension funds used to be regulated by the Pensions and Insurance Supervisory Authority (Pensioen- & Verzekeringskamer), which was integrated into the De Nederland'sche Bank (DNB), the Dutch Central Bank, thus creating an integrated supervisor for banks, insurance companies, security firms and pension funds. Besides the DNB, the financial market authority is the second supervising authority responsible for protecting pension plan members.

Accord for banks)'[119]. The new FTK was finally implemented as of January 2007, with a delay of one year, and after some relaxations, i.e. lengthening of the required recovery periods.

The pension liability relevant for regulation-purposes is the pension liability derived from the accrued nominal benefits discounted with the term structure of zero-coupon interest rates. The applicable yield curve is published monthly by DNB based on interest rates in the interbank swap market. Conditionally indexed benefits are excluded from the funding requirements. Dutch pension funds pay indexing out of their current investment returns, only unconditionally indexed benefits must be backed by funded assets. This regulation is the main reason that pension funds have nearly all clarified that indexing of pension benefits is conditional. The difference between the regulatory relevant 'nominal' funding ratio and the funding ratio 'in real terms' refers to the conditionally indexed pension benefits, which can amount to approximately 50 percent of the pension funds' balance sheet.

At the heart of the Dutch pension regulation are the solvency requirements. Pension funds have to fully fund their nominal liabilities with a solvency buffer of 5 percent. The probability of undershooting 100 percent may not be larger than 2.5 percent, which has to be proven in a solvency test. This requires the average pension fund to be funded at approximately 130 percent of their nominal liabilities[120]. Pension funds are

[119] Pensioen-& Verzekeringskamer, Financial Assessment Framework Consultation Document, Available at: http://www.dnb.nl/dnb/home/supervision/supervision_of_pension_funds/ftk_consultation/en/47-150605-64.html , [accessed 20/06/2012]

[120] Pensioen-& Verzekeringskamer, Financial Assessment Framework Consultation Document, Available at:

given a recovery period of three years to restore financial stability if the funding ratio falls below a funding ration of 105 percent. This three-year-deadline (initially, policy had proposed a one-year-deadline which was extended to 3 years after intense lobbying of the pension fund industry) was temporarily extended to five years in the wake of the credit crunch crisis. Pension funds are requested to prepare a recovery plan with a planned recovery period of up to 15 years, which must get approved by the regulator, when the funding level is between the targeted solvency balance (130 percent for the average fund) and the minimum funding level of 105 percent. Pension funds also have to pass a continuity test every three years, where they have to prove in the framework of an ALM study their long-term financial stability over a period of 15 years, including the outlining and financing of their indexation objectives. In the current crisis 350 pension plans had to submit a recovery plan.

There are three ways to perform the solvency test, which vary according to complexity and sophistication. Small pension funds with a low risk profile of their investment portfolio can apply the 'simplified method' thus exempting from any complicated calculations. The solvency test provided by the Dutch Central Bank under the 'standard method' will be applied by most pension funds, which is a scenario technique to calculate their funding requirements based on the composition of their portfolios. Based on historic data this test provides pension funds with scenarios for market and credit risk they have to fulfil with 97.5 percent probability measured on a one year horizon. The implementation of internal models comparable to those introduced to the banking industry within Basle II constitutes the most sophisticated way in terms of

http://www.dnb.nl/dnb/home/supervision/supervision_of_pension_funds/ftk_consultation/en/47-150605-64.html [accessed 20/06/2012]

risk management to perform the solvency test. According to consultants, the parameters were chosen in a way that internal models will not be rewarded and therefore are unlikely to get implemented.

Investment regulations will not be affected by the new pension legislation. Current regulations are based on the prudent person rule. There are no quantitative investment rules apart from a 5 percent ceiling on investment in the sponsoring employer (10 percent in the case of employer groups).

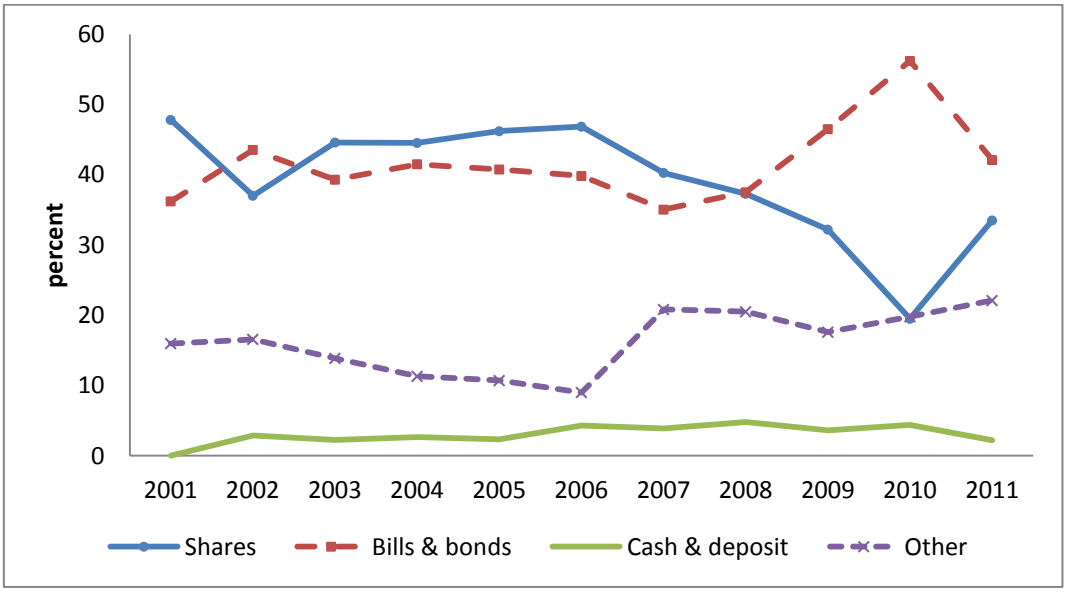
The Dutch regulator responded in two steps to the very low level of interest rates since 2009. First, in late 2011 DNB allowed pension funds to use a three-month average of the EUR swap rate, i.e. to apply interest-rate smoothing. In September 2012 the Dutch Government announced the upcoming introduction of the 'ultimate forward rate'. Pension liabilities with a maturity of more than 20 years will be discounted with a fixed discount rate of 4.2 percent instead of the current market rate.

5.3.6. Investment Strategies

Starting in the 1980s and accelerating in the 1990s, Dutch pension funds shifted their assets into equity. Since the early 2000s, the asset allocation of Dutch pension funds remained remarkably stable. The equity exposure fluctuated only slightly between 35 percent and 41 percent. A study on the financial behaviour of Dutch pension funds from 2002 onwards confirms that 'pension funds do not reduce the risk of their portfolio after a deterioration of their financial position' (Kakes, 2006). Rebalancing behaviour, i.e. restoring a strategic asset allocation by net purchases or sales to balance price movements, was found especially for the large industry-wide pension funds, whereas company-pension funds, on the other hand, are faster at adjusting contributions.

According to the DNB, this rebalancing behaviour also contributed to market stability during the GFC, when the 40 largest pension funds were found to be net purchasers of equity[121].

Figure 5.2: Pension fund asset allocation for selected investment categories: Netherlands



Source: OECD GPS (for methodology see table 3.1)

With two-thirds of their assets invested abroad, there is no noticeable home bias of Dutch pension funds. Differences in the asset mix were found to be attributable mostly to size: 'Large pension funds hold more foreign assets than small ones'. But company pension funds, which are usually smaller than the industry-wide ones, 'are more internationally orientated' (Kakes, 2006). This internationalisation of the pension funds' asset allocation took place during the 1990s, when Dutch pension funds diversified out of private loans, mostly to the Dutch Government, into equities, real estate and bonds (van

[121] De Nederlandsche Bank, DNBulletin, 07/04/2011, Available at: http://www.dnb.nl/en/news/news-and-archive/dnbulletin-2011/dnb250677.jsp [accessed 20/06/2012]

Riehl et al., 2003). Van Riehl et al. suggest that this internationalisation was driven, first, by the privatisation of the largest Dutch pension fund, ABP, and its subsequent change of asset allocation as its investment policy was deregulated, and , second, by the limited opportunities for risk sharing in the Netherlands, which necessitates international investment.

While the interviewees acknowledged sufficient degrees of investment freedom, they also noted a shift towards liability immunisation induced by the introduction of FTK. The introduction of the new regulatory framework changed the investment behaviour. LDI strategies became very popular, but in a specific Dutch understanding: Instead of a risk-immunising strategy, the Dutch view focuses more on using the liabilities as the benchmark for the management of assets, a view which is more consistent with the actual asset allocations. Early simulations from the research department of the DNB expected the FTK ' to only slightly reduce the attractiveness of equity investment' but the ' the optimal duration of bonds in portfolio seems to be much higher than currently observed' (Vlaar, 2005). According to market participants, reducing the interest-rate mismatch between the duration of the pension assets and the usually much longer duration of the pension liabilities has become widespread. This was backed by research from the DNB, which found that already 'in recent years, many pension funds have extended the average maturity of their fixed-income portfolios'[122]. A further technique to reduce the duration mismatch especially in the context of a Dutch pension funds seeking full inflation-indexing is shifting parts of the portfolio into inflation-linked bonds. Inflation-rate swaps are increasingly applied to fully hedge the interest-rate mismatch, especially as the swap

[122] De Nederlandsche Bank, Statistical Bulletin June 2007, Available at: http://www.dnb.nl/dnb/home/news_and_publications/dnb_publications/statistical_bulletin/en/47-151587-64.html, [accessed 20/06/2012]

market is much more liquid than the marked for inflation-linked bonds and also Dutch pension funds are experienced derivative investors.

Overall, Dutch pension funds have become more funding orientated, 'the investment policy is turned to the goal of maintaining a certain solvency level in the fund.' The new regulatory framework, which seems to be based on broad consent in the Dutch community, was cited as the main reason for this change in the investment strategies, followed by the new accounting rules IAS 19.

Asset Management is often conducted in-house. Especially the large industry-wide pension funds employ highly professional teams and can be regarded to be at the cutting edge of investment and risk management know how. These investors increasingly capitalise on risk premiums apart from equity, which can be found in alternatives, thereby either reducing or better diversifying risk. An increasing number of pension funds outsource the investment process under a 'fiduciary management' arrangement, which is basically a partnership between the pension fund and the fiduciary manager, who is the agent acting on behalf of the pension fund. This is mostly done by smaller pension funds. But also larger funds, which retain their legal structure, efficiently transfer the management of the pension funds to professional pension fund management companies, under a 'fiduciary management' arrangement. The pension fund board concentrates on strategic issues and supervises the fiduciary manager. The fiduciary manager advises the board and takes over all operational issues, ranging from proposing the strategic investment policy, constructing the investment portfolio, manager selection up to reporting and risk management. The fiduciary manager usually refrains from managing

client's assets themselves thus reducing conflict of interest. This concept requires carefully monitoring the inherent principal-agent problems.

In general, investment strategies of Dutch pension funds were criticised in the wake of the GFC. Pension funds were found to take too much investment risk (Frijns 2010). According to the DNB: 'The expansion into equity has increased the dependence on financial markets'[123].

5.3.7. Risk Management

The main risk management tool is Asset-Liability-Management, which can be regarded as being firmly in place in the Dutch market, although the Kakes' study(2006) states that ALM becomes (even) more important following the fact that it is now legally required. The large industry-wide pension funds and the large pension fund management companies conduct the ALM themselves, but mostly ALM-studies are carried out by consultants. ALM is mostly used as a tool to decide on the optimal pension policy in the framework of the 'pension deal' and to derive the strategic asset allocation.

The implementation of the fair value principle, which makes both pension funds' assets and liabilities volatile, poses a challenge for risk-managing. The leading Dutch pension funds developed their ALM tools into what is called 'value-based ALM'. 'As future outcomes are discounted back to the present with an appropriate risk adjusted discount rate' the present value of the key variables is added to the information given in the ALM. Kortleve and Ponds (2006) demonstrated that when risk preferences, which are commonly an exogenous variable in ALM models, are made endogenous under 'value-based ALM', the pension fund usually lowers its risk profile.

[123] De Nederlandsche Bank, Quartely Bulletin December 2010.

ALM represents in the Netherlands the strategic tool for deriving the pension deal and to manage risk on the strategic level. Risk budgeting is a more operational tool which is further supplemented by risk monitoring. According to a market participant Dutch pension funds 'map the whole investment process from the SAA to the TAA, the sector allocation, timing, yield curve position etc. and to allocate risk budgets to each step in the investment process. They apply tracking error limits and basically calculate the performance contribution and the tracking error of each step of the investment process. This is a relative VaR approach compared to the benchmark'.

5.4. United Kingdom

5.4.1. Context

The UK pension fund market is the largest in the European Union. Total investment of pension funds is estimated at GBP 1,300bn which is equivalent to 87 percent of GDP[124]. The number of pension funds providing pensions to employees in the private sector is estimated at 44,380 in 2010, thereof 80 percent with less than 12 members. Over 70 percent of active employee members are concentrated in a small number of very large pension funds with more than 10,000 members[125]. This setting renders the UK pension market highly fragmented in terms of scheme numbers and fairly concentrated in terms of scheme size at the same time. The single company pension fund is the dominating organisational form in the United Kingdom.

[124] OECD, Pension markets in Focus, Available at: www.oecd.org/daf/pensions/pensionmarkets, [accessed 20/06/2012]
[125] Occupational Pension Schemes Annual Report 2010, Office for National Statistics, Available at: http://www.ons.gov.uk/ons/rel/pensions/occupational-pension-scheme-survey-annual-report/2010-annual-report/art-opss2010.html [accessed 20/06/2012]

The market has experienced rapid change. First, sponsors moved swiftly to close DB pension funds and replace them with cheaper DC funds. Every third of the estimated 3 millions of active members of private occupational pension schemes was covered by a DC plan in 2010 compared to every fifth five years earlier. Second, the overall number of private sector pension funds has fallen by nearly 40 percent since 2005. Taken together, the 'widespread abandonment of the defined benefit (DB) field by private sector employers indicates a problem' (Salt, 2010).

According to the Purple Book[126] at end-March 2011 84 percent of DB pension funds were closed, mostly to new members (58 percent), but 24 percent also to future accruals of existing members. 2 percent of schemes were winding up. This leaves only 16 percent of all private DB schemes open. This trend started at the smaller schemes but has now also reached larger pension funds. In January 2012, the oil company Shell was the last FTSE 100 company to close its DB scheme to new members[127].

5.4.2. Funding Status

The funding status of UK pension funds remains volatile. It firstly raised attention and concerns among policymakers during the 2000 – 2003 crisis when the aggregate shortfalls were estimated in a range from GBP 55bn to 65bn, representing 6.5 percent of GDP (OECD, 2005). Since then, funding remained in the close focus of regulators; new methodologies and statistics for measuring and tracking the funding status were

[126] The 'Purple Book' is a joint publication by the Pension Protection Fund (PPF) and The Pensions Regulator (TPR), which analyses 6,432 PPF-eligible schemes, representing 99.6 percent of estimated total liabilities. Available at: http://www.pensionprotectionfund.org.uk/DocumentLibrary/Documents/Purple%20Book_2011.pdf [accessed 20/06/2012]

[127] http://www.pensionfundsonline.co.uk/460/pension-funds-insider/last-ftse-100-firm-closes-db-scheme-to-new-members [accessed 20/06/2012]

subsequently developed. Most widely used for statistical purposes is the PPF7800 index which is calculated by the Pension Protection Fund (PPF) on a monthly basis. According to these figures, DB pension schemes, which had in 2010 successfully recovered from the deficit situation following the GFC, posted a record deficit of GDP 271bn in January 2012 which decreased slightly to GDP 206bn in March 2012[128]. Unusually low gilt yields were pushing up pension funds' liabilities, which is widely related to the monetary policy of the Bank of England and prompted the demand for regulatory relief[129].

Turbulent financial markets and a changed regulatory policy exerted significant financial strain on sponsoring companies. Total contributions to pension schemes, which were flat between 1984 and 1998 when schemes were in surplus, started rising in 1999. Not only that normal contributions were resumed after the previous contribution holidays, according to ONS companies put in nearly GBP 70bn[130] in special, deficit-repairing contributions since 2005 alone, and industry voices expect up to GDP 100bn further contributions over the next three years representing 13 percent of UK corporate cash holdings[131]

This highlights some of the difficulties surrounding the concept of 'funding' as key regulatory policy variable. Funding gaps are ambiguous as, firstly, their extent

[128] Pension Protection Fund, 7800 Index , Available at: http://www.pensionprotectionfund.org.uk/DocumentLibrary/Documents/PPF_7800_April_12.pdf , [accessed 20/06/2012]
[129] See e.g. NAPF, 'Exceptional times, exceptional measures?', Available at: http://www.napf.co.uk/PolicyandResearch/DocumentLibrary/~/media/Policy/Documents/0221_Exceptional_times_exceptional_measures_economic_developments_and_the_impact_on_pension_schemes_and_members__March_2012.ashx , [accessed 20/06/2012]
[130] ONS, Pension Trends, Chapter 9: Pension scheme funding and investment, Available at: http://www.ons.gov.uk/ons/rel/pensions/pension-trends/chapter-9--pension-scheme-funding-and-investment--2011-edition-/index.html, [accessed 20/06/2012]
[131] Pension Corporation, Available at: http://www.pensioncorporation.com/sites/default/files/press/15_may_2012_ei_survey_release_may_2012.pdf, [accessed 18/05/2012]

depends on the disputable choice of the valuation methodology and, secondly, per se they do not take into account the solvability of the sponsoring employer, the sponsor's covenant, which underwrites the pension promise in the Anglo-American pension system. The United Kingdom is the only of the here analysed countries where 'funding' is ambiguous as a number of different methodologies are used. Even the Purple Book documents different approaches to funding: At end March 2012 funding levels of pension schemes in the United Kingdom are stated at 100 percent on a 's179' (section 179) basis, and as 67 percent on a full buy-out basis. In former years, also the FRS17 figure was published. This variety of data on a key regulatory variable, namely 'funding', contrasts sharply with the regulatory practice in other countries, where 'funding status' is unambiguously defined and measured. Pension funds usually report four different figures describing their funding status. The most important figure from the point of view of the pension fund is their actuarial valuation on an ongoing basis which is conducted according to the guidelines from the actuarial profession. Liabilities are calculated as accrued liabilities and discounted usually with the expected return on assets. But as each fund applies its own 'best actuarial' estimate pension funds' valuations are not compatible.

The funding level according to FRS17/IAS19 represents the accounting view of pension schemes. Plan sponsors are requested to calculate a projected benefit obligation, which includes mainly future salary increases, and to discount it with the yield of corporate bonds. As there are less parameters of choice in this valuation, the resulting figures are comparable over the variety of pension funds. But as the pension liability according to the FRS17/IAS19 rules usually exceeds the pension liability in the actuarial valuation, a pension fund which is fully funded under its own actuarial valuation can still

imply a significant deficit for the plan sponsor. The third funding ratio usually reported by pension schemes is the funding level calculated according to the rules of the Pension Protection Fund (PPF), the 's 179' funding level which is the basis for calculating the PPF's risk-based pension protection levy. It is calculated to reflect the volume of pension liability the PPF would expect to take over in case of eligibility. It is therefore 'related to the costs of buying out liabilities with a regulated insurance company rather that the ongoing valuation' (Purple Book, 2007) but reduced according to the benefit caps the PPF applies when paying compensation, e.g. a general reduction on benefits of 10 percent. The 's179' valuation is probably the most appropriate figure for the purpose of statistical comparisons, as the PPF closely prescribes the actuarial assumptions to be applied[132]. At last, the 'full buy-out' ratio represents an estimate of the cost an insurance company would place on the pension fund in the case of a buy-out. The situation in the United Kingdom demonstrates the difficulty of constructing 'funding'. All funding ratios have their own rational, but can produce different narratives.

5.4.3. Governance Structure

Occupational pension funds in the United Kingdom are usually set up as pension trust funds which are legal structures connecting the assets provided by the plan sponsor for funding the pension promise, with the trustees holding these assets for the benefit of the individual members (Blake, 2003). The relationship between the three involved parties and their agents, i.e. actuary, consultant, investment bank, informs the governance structure at UK pension funds. Unlike their counterparts in continental Europe, UK

[132] Pension Protection Fund, Guidance for undertaking the valuation in accordance with Section 179 of the Pensions Act 2004, Available at: http://www.pensionprotectionfund.org.uk/section_179_guidance_version_g4_april_2007.pdf, [accessed 20/06/2012]

pension funds have mostly very small staff, therefore relying heavily on outside advice and operational support. Trustees are bound by fiduciary law to act in the sole interest of the beneficiaries. The 'general power of investment'[133] rests with the trustees. This power is bound by the 'duty of care' and the obligation 'to obtain and consider proper advice'. This regulation paved the way for the strong influence of the pension consultants in the United Kingdom. UK pension funds overwhelmingly use external investment managers; internal asset management is confined to some of the very large funds. UK pension funds rely heavily on consultants in determining the investment strategy. The attitude towards consultants could be described as heterogeneous, ranging from denoting them as 'the angels of the trustees' up to describing the UK as being in the 'stranglehold of the large consultants'. The 'reliance by trustees on a small number of investment consultants supplying actuarial and investment advice bundled together' was addressed by the Myners' report (2001) as one of the problems in the UK pension market resulting from the trustees' lack of the necessary investment expertise. Although in the United Kingdom, as in all Anglo-American systems, the trustees are firmly at the heart of the pension fund system, UK law does not require trustees to have professional know-how, only that they 'obtain proper advice' about it. What is legally termed 'the duty of care' and generally referred to as 'prudent person rule' requires trustees to act with 'reasonable care and skill'. Shortcomings in the competence of trustees and consultants were first addressed in the 'Myners' Report', subsequently academically researched, see e.g. Clark et al. (2006, 2007, 2009), and finally politically addressed.

[133] Trustee Act, 2000, Available at: http://www.opsi.gov.uk/ACTS/acts2000/20000029.htm, [accessed 20/06/2012]

Role and duty of the trustees and their relation to the plan sponsor were last clarified by the Pensions Act 2004 and further detailed by the 'Codes of Practice' issued by The Pensions Regulator, the regulatory authority which was established April 2005 following the 2004 Pensions Act in succession to the Occupational Pensions Regulatory Authority (OPRA). A detailed process was established as to the responsibilities of the trustees regarding the funding of the pension fund, the instances in which the agreement of the employer needs to be reached or where the employer is merely consulted and how to manage conflicts. TPR regularly surveys pension funds governance. The 2011 survey found consistent improvement in governance standards, but persistent weaknesses with smaller schemes, especially with regards to managing conflicts of interest[134].

In general, the implemented reforms opened a gap between the sponsor and the board of trustees, or as a former regulator put it, turned it into a 'proper arms-length relationship'. It is suggested that the changed governance imposed on pension funds by the Pensions Act 2004 and subsequent interpretations by the regulating authority significantly impacted the risk attitude at UK pension funds and their stakeholders. The trustees who are responsible for the investment decisions have in many cases become significantly risk averse as they are not rewarded for risk-taking. Even though pension benefits are fixed by nature, they can be increased in case of overfunding. This measure was often implemented when the 1986 Finance Act requested pension funds to reduce surpluses - which were soaring during the stock market boom of the 1980s - to be reduced within five years to a maximum of 5 percent. But since the subsequent financial crisis have turned pension funds from surplus to deficit and a majority of pension funds have

[134] TPR (2011). 'Occupational pension scheme governance: A report on the 2011 (fifth) Scheme governance survey'. Available at: http://www.thepensionsregulator.gov.uk/docs/governance-survey-report-2011.pdf , [accessed 26/06/2012]

been closed, safeguarding existing benefits has been turned into the first priority for scheme trustees.

5.4.4. Pension Plan Design

The traditional pension plan in the United Kingdom was a DB final salary plan, where the pension at normal retirement age is related to pensionable earnings at the time of leaving service or shortly before. The typical rate of accrual at private sector funds is $1/60^{th}$ of annual salary. The average contribution rate to private sector DB schemes was 20.8 percent in 2010, thereof 5.1 percent member contributions. Investment and longevity risk are usually borne by the employer only. Therefore, one can argue that the solvency of the sponsor, the 'covenant' underwrites the pension promise. Occupational pension schemes in the United Kingdom have employed different variants in negotiating changes to plan design to re-distribute risk between the stakeholders. Pension deals at companies' pension funds mostly included burden sharing in the sense that early retirement options became less onerous or that employees' contributions were being increased in exchange for the willingness of the plan sponsor to keep the pension plan open for new accruals, but investment and longevity risk mostly stayed with the company. Over the last years, also average-salary plans have become more wide-spread (Sutcliffe, 2007). In 2010 26 percent of DB scheme members had an average-salary plan. But mostly UK employers replace the DB pension plan with a DC plan, thereby shifting risk to employees and reducing costs. The average contribution rate to a DC plan was 8.9 percent in 2010 compared to 20.8 percent on average in DB pension plans. Until April 2011, people with DC pension plans were required to buy an annuity at the age of 75 the latest. By removing this requirement the management of longevity risk in addition to investment risk was shifted to the employee.

Since 1997 pensions in payment must be indexed. The Pensions Act 1995 turned the prevailing market practice into a legal requirement. Pensions which accrued after April 1997 must be indexed with the retail price index up to a maximum of 5 percent p.a. For pensions accruing from 2005 onwards this cap was reduced to a maximum of 2.5 percent p.a.[135]. This indexing requirement renders inflation hedging an important investment goal at British pension funds and distinctly increased the cost of providing DB pension benefits. As one plan sponsor remarked: 'Indexation of benefits is the biggest threat to DB plans'. According to market participants, most employers have therefore stopped granting not-legally required annual cost of living adjustment in the wake of what is commonly termed the 'pension fund crisis' of the early 2000's, exploiting the fact, that inflation adjustment is not included in the trust deed but at the employer's discretion.

5.4.5. Regulation

Workplace pension reform will be implemented from 2012. The cornerstones are automatic enrolment and the introduction of a new DC pension scheme, the National Employment Savings Trust (NEST). Starting in October 2012, all employers must enrol their employees subject to certain specification into a pension scheme. They can use existing pension schemes, establish new ones or use NEST which is the Government established entity providing simple and low-cost pensions aiming at low-income groups. The total contribution rate must be a minimum of 8 percent, thereof 3 percent employer contributions. These requirements will be introduced in stages until 2017.

Prior to that, a major pension reform was implemented in 2004 coming into force at end 2005. The salient elements were the establishment of a pension insurance fund, the

[135] From April 2011 the government transferred the indexing requirement to the consumer price index but withdraw in May 2012.

Pension Protection Fund (PPF), for protecting pension benefits in case of insolvency of the plan sponsor and the establishment of a new regulatory authority, The Pensions Regulator, which supervises the implementation of the risk-based and funding-orientated approach, thus also 'protecting' the PPF.

The new regulatory approach defines itself as risk-based and rule-based, risk-based in so far as it focuses on the most significant risks, and rule-based in the sense of focussing on outcome and procedure rather than on the prescription of specified rules. As the UK occupational pension system is trustee-based, regulation became strongly focussed on enabling trustees to supervise the pension schemes in the legally prescribed prudent way thereby following a scheme-specific approach, i.e. recognising the specific and individual properties of the single scheme. Insofar, UK pension fund regulation could be characterised as regulation of governance.

This philosophy lies at the heart of the new funding concept, which was adopted by the Pensions Act 2004 and further outlined by the new regulating authority, The Pensions Regulator. In general,

'every scheme is subject to a requirement ('the statutory funding objective') that it must have sufficient and appropriate assets to cover its 'technical provisions''[136].

The trustees are required to decide on their funding policy and to draw up a statement of funding principles[137]. The funding status is assessed by the scheme specific actuarial valuation which is in the United Kingdom conducted every three years. If the pension fund does not meet the statutory funding requirement, it must prepare a recovery

[136] Pensions Act 2004,Chapter 35, Available at: http://www.opsi.gov.uk/acts/acts2004/ukpga_20040035_en_2, [accessed 20/06/2012]
[137] The Pensions Regulator, Regulatory Code of Practice 03, 'Funding defined benefits', Available at: http://www.thepensionsregulator.gov.uk/docs/code-03-funding.pdf , [accessed 20/06/2012]

plan which details the measures to be taken and the needed timeframe to recover to full funding. This recovery plan has to be handed in with The Pensions Regulator. But neither pension law nor the regulator's interpretation specify the exact methodology of valuation or further actuarial assumptions. It is the task of the trustees to choose the assumptions with prudence and with regard to reasonable affordability (payable contributions must be reasonably affordable to the employer) based on the advice of the scheme's actuary and in consultation with the employer following a process specified by the regulating authority. The regulatory approach, therefore, gives general guidance but leaves the detailing in the responsibility of the pension funds.

The change to a principle-based approached was also a result of criticism of and experience with the former funding regime, the Minimum Funding Rule (MFR), which was introduced by the 1995 Pensions Act. It marked the first time that funding became a relevant policy issue. The MFR obliged employers to fully fund their liabilities according to specified definitions. Funding gaps were for the first time turned into legally enforceable debt of the employer. As Blake (2003) points out, prior to the act, employers could decide to wind up their pension funds and reduce the benefits according to the availability of funds. Although a binding policy requirement for only a short time, the MFR was strongly criticised from the beginning, among others, as being too strict, not taking into account scheme-specific factors, and because 'the MFR has encouraged pension fund managers to lower their weighting in equities and other 'volatile' assets' (Blake 2003)[138]. The regulatory authorities were mostly concerned with the MFR because

[138] The 1995 Pensions Act introduced the 'Minimum Funding Requirement' (MFR) which obliged funds to be funded according to prescribed definitions. The MFR was incrementally introduced between April 1997 and April 2002 and effectively suspended in 2004.

albeit constructed as a minimum rule it actually served as policy goal which triggered funds to lower their funding level down to the now legally allowed level.

The new approach also caused concern at first, as it gave little orientation. This changed with the release of the so-called 'trigger-points' for regulatory action - and with experience. The primary triggers which will prompt further regulatory action include:

- A trigger for technical provisions, which is set at a not further specified point between the employer's accounting standard (either FRS17[139] or IAS19) and the 's179' basis set by the Pension Protection Fund depending on scheme maturity and employer covenant strength.

- Recovery plans with recovery periods of more than 10 years, plans where the special contributions are concentrated at the end of the recovery period, or plans with 'inappropriate' investment return assumptions[140]

In general, pension funds commented that regulation does not impact their investment strategy. None of the interviewed pension funds followed an explicit funding target at that time. The regulatory changes that were cited to have the most impact are the changes to the governance structure (see section4.4.3.)[141]. This can be expected to have

[139] In reaction to the large spread between corporate bonds and gilts during the 2007/2008 crisis, TPR dismissed FRS17 as an adequate lens for providing prudence without further adjustments.
[140] The Pensions Regulator, Recovery Plans – an initial analysis, Available at: http://www.thepensionsregulator.gov.uk/pdf/recoveryPlansSept2007longVersion.pdf, [accessed 20/06/2012]
[141] Cited among regulatory changes impacting pension funds was also the 1997 tax budget which abolished tax relief on dividends paid into pension funds which was at that time estimated to cost pension funds about GBP 4bn per year. Available at: http://www.hm-treasury.gov.uk/media/8/F/foi_dividend_background.pdf, [accessed 20/06/2012]

changed but further inquiry is beyond the scope of this research. We will further inquire into the causation of the observed changes in investment in the next section.

5.4.6. Investment Strategies

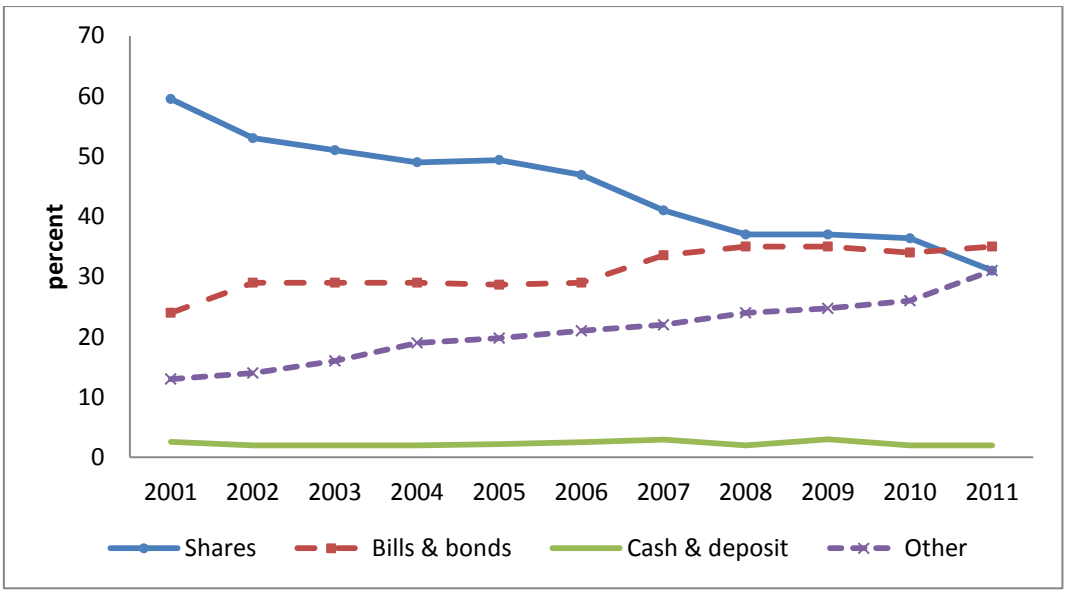
The reduction in the equity exposure and the rise of 'other investments', mainly hedge funds and Liability-Driven-Investment (LDI) Strategies are the most significant changes to investment patterns at UK pension funds. Discussed at length, both trends are now firmly established in the market, even though statistics offer slightly ambiguous views[142],

Traditionally, UK pension funds had the highest equity exposure of all OECD countries which is usually quoted at around 70 percent. UK pension funds also invested around 10 percent of their portfolio in property. Bonds constituted the remaining portfolio. The classical balanced mandate, with 70 percent of assets invested in equity and 30 percent invested in bonds and other assets constituted the dominating investment practice. This underlines the statement of a market participant: 'Pension funds in the UK have lived off beta, of rising equity markets'. According to the traditional pension investment paradigm, shares constitute the best hedge against inflation. As UK pension funds are legally obliged to index pension benefits, hedging inflation constitutes a major investment goal. This rather crude investment policy was not discouraged by either

[142] Reliable data on asset allocation are surprisingly hard to obtain. The Office of National Statistics produces the quarterly ONS Pension Funds' survey which is directed at a sample of 350 private and public sector pension funds. The figures are very detailed on asset classes but do not give 'look-through' data on mutual fund. The equity exposure of UK pension funds is generally stated considerable lower than in all other sources. The Purple Book covers a large statistical sample, but not very detailed asset classes. The NAPF does not cover asset allocation itself in its surveys but only asks for changes in the SAA. The most widely used figures are those published by large consultants based on customer surveys. Recently, also Investment Management Association (IMA) started to regularly publish data based on member surveys.

context or regulation. Given this portfolio composition, pension funds were heavily exposed to market risk, namely volatility of equity markets, but it was obviously considered as an acceptable risk. Investment strategies were not geared at avoiding or minimising market risk. Pension funds were less mature and the traditional actuarial valuations, which were conducted every three years, applied extended smoothing thus ignoring market risk to a large extent. This has changed: Most surveys quote UK pension funds equity exposure at end 2011 at around 40 percent which represents a noticeable reduction compared to former levels. UK pension funds started to de-risk their portfolios. According to the Purple Book that 'there is a clear tendency for the proportion of assets held in gilts and fixed interest to rise as scheme maturity increases'. At 40 percent, bonds account now for around the same weight in pension funds portfolios as equity.We provide here the OECD data for illustrative purposes:

Figure 5.3: Pension fund asset allocation for selected investment categories: United Kingdom



Source: OECD, GPS (for methodology see table 3.1)

The last decade saw a significant trend toward specialisation in the UK institutional market. The core-satellite-approach is firmly market practice. Pension funds have moved away from balanced mandates, employing specialist managers instead. On the one hand, this is clearly reflected in the internationalisation of UK pension funds' investment: UK pension funds moved from domestic into international equity investments. The proportion of international equity in total equity investment rose to 57 percent in 2011[143], which is clear evidence of an erosion of the former home bias. LDI strategies were invented for UK pension funds in the early 2000s and have been intensively discussed ever since. Predicted to become the dominating investment strategy within short, the uptake of LDI stayed below predictions but picked up in 2007 and 2008. The IMA survey estimates LDI pension assets under management at GBP 200-250bn in 2011[144]. It seems that especially smaller pension funds are interested in this investment strategy, a suggestion which is clearly backed by the expert interviews conducted with pension funds.

UK pension funds have in general become more risk-conscious and funding-focussed de-risking their investment portfolios. Regulation was mostly classified as neutral to the investment strategy by the interviewed market participants. Albeit, according to a pension fund manager, today 'there is a lot of focus on the question: 'How much downside can I tolerate?' That is really the focus of setting the investment policy. The main concern is that the deficit grows again'. The regulatory bodies in the United Kingdom are encouraging the de-risking of pension funds by shifting assets from equity

[143] The Purple Book 2011, Available at: http://www.thepensionsregulator.gov.uk/docs/purple-book-2011.pdf , [accessed 20/06/2012]
[144] IMA, Asset Management in the UK 2010-2011, The IMA Annual Survey, Available at: http://www.investmentuk.org/research/ima-annual-industry-survey/, [accessed 18/05/2012]

to bonds. This pressure can be expected to increase as the Pension Protection Fund includes a measure on the scheme's investment risk in the calculation of the individual scheme's levy from 2012 onwards. We suggest that the observed changes in investment are induced, first, by the changing properties of pension liabilities as we witness the maturing of mostly closed pension funds. Second, the changed regulation of governance enacted in the Pensions Act 2004 and its subsequent interpretation by the regulating authorities, as we described in more detail in section 4.4.3, turned trustees more risk-averse. The changes in accounting rules refer to the sphere of the sponsoring company. The sponsor's agenda can affect investment decisions only via negotiations, as we discussed in section 3.3.2, as the power of investment rests with the trustees. In all interviews the independent behaviour of the trustees in setting the investment policy was emphasised ('The CFO must put up with the decisions of the trustees').

5.4.7. Risk Management

Managing pension risks has become a critical issue both for the pension scheme and the sponsoring company. As the vast majority of DB pension funds are closed, company and trustees start considering the final settlement of the pension fund what is termed End Game. Total risk transfers offer the most radical solution to pension risk. In the United Kingdom a significant business has developed comprising of buy-outs, buy-ins and longevity hedges of a total of GBP 31bn in 2011 according to the Purple Book. About the same volume of liabilities is hedged against interest and inflation movements.

The key risk management instrument to access the different options is ALM. According to market participants, ALM is standard in the market and has been for quite some time, although the link between assets and liabilities has tightened: 'In the 1980s

and 1990s, the asset allocation was done in the light of the liabilities, we are getting a much greater and more direct input from the liabilities now.' The reasons can be attributed to the increasing maturity of the funds and a more funding focused attitude of all stakeholders: 'There are fewer degrees of freedom available now'.

ALM studies are usually conducted every three years along with the actuarial valuation. Since Myners' criticism of the bundled provision of actuarial and investment advice, advice is more often split between the few large pension consultants in the UK, who also provide risk modelling, calculating and budgeting analysis. VaR calculation are being conducted, scenarios generated, fat tails analysed. At some pension funds 'asset-liability-modelling has become an ongoing process'.

According to the NAPF survey, nearly 90 percent of schemes (asset-weighted) base their investment decisions at least in part on an asset-liability study. 'Large employers are more likely to use asset-liability studies' (NAPF). Asset-liability studies are in the UK conducted by consultants. Nearly 80 percent of funds base their SAA decision on the advice of an external consultant.

But the general reservations in the United Kingdom towards asset-liability modelling which were also formulated in the Myners report still persist. The Pensions Regulator's Code of Practice on Funding Defined Benefits reiterates Myners' criticism that the results of the ALM depend decisively on the assumptions made and explicitly warns trustees that ALM may not be mistaken as a forecasting tool 'rather they are

illustrative of possible outcomes' and should not 'take on a credibility in the eyes of trustees and others which is unwarranted'[145].

But also some interviewees expressed concern against the currently available quantitative risk management tools, which they say apply risk definitions and risk management approaches that are not suitable for the needs of pension funds. This criticism refers to the treatment of market risk and the definition of the investment horizon. Especially industry-wide pension funds who are not concerned with the sponsor's covenant tend to ignore the risk management systems derived from the bank's trading departments conceptualising themselves as the classical long-term investor: 'We don't pay any attention to something like Value-at-Risk', further stating: 'We are a friend of volatility'. But also users of sophisticated risk management systems like the tools marketed by Barrie&Hibbert mostly at insurance companies express concern about becoming too short-termed: 'Risk budgeting with a VaR on the basis of one year is probably not a great thing for a pension fund'. But as there is no legal necessity to manage the fund along these lines, UK pension funds tend to use these systems more as an information tool and not as a stringent management tool.

5.5. United States

5.5.1. Context

With private pension assets under management of USD 10.4 trillion at the end of 2011 the US pension market is the largest pension market worldwide in absolute terms.

[145] The Pensions Regulator, Code of practice: Funding defined benefits, Available at: http://www.thepensionsregulator.gov.uk/codesOfPractice/definedBenefit/index.aspx, [accessed 18/05/2012]

According to the OECD, this is equivalent to 73 percent of GDP[146]. Employer-sponsored pension plans account for USD 6.1 trillion, 65 percent thereof were hold under a DC plan and 36 percent under a DB plan[147]. About 50 percent of workers in the private industry participate in a retirement plan. The market is highly segmented. Since the mid-1980s, the number of plans seems to have stabilised at a level around 700,000, over 90 percent hereof constituted by DC plans with the vast majority being very small plans with less than 100 participants[148]. Single-employer plans are the dominating organisational form in the United States.

The long-term decline of DB pension plans in favour of DC plans is extensively academically researched[149] and shall be only documented in a nutshell here. The importance of DB pension funds in the United States in terms of both number of plans and number of active participants peaked in the mid-1980s at 175,000 plans in 1983 and 30 million active participants in 1984 respectively. But the move from DB to DC had actually already started in the mid-1970s when the number of newly created DC plans started to outnumber newly created DB plans. 1984 marked the first year when the active participants in DC plans outnumbered those in DB plans. But only in the mid-1990s did DC pension funds surpass DB funds in absolute terms with the market share of DB pension funds falling steadily to 36 percent in 2011.

[146] OECD, Pension markets in Focus, Available at: www.oecd.org/daf/pensions/pensionmarkets, [accessed 20/06/2012]

[147] A further USD 4.6 tr are hold in Individual Retirement Accounts (IRAs), Source: Board of Governors of the Federal Reserve System, Flow of Fund Statistics, Available at: http://www.federalreserve.gov/releases/z1/Current/z1.pdf , [accessed 01/06/012]

[148] U.S. Department of Labor, Private Pension Plan Bulletin. Available at: http://www.dol.gov/ebsa/PDF/2009pensionplanbulletin.PDF, [accessed 01/06/012]

[149] For an analysis of the shift from DB to DC in both the US and UK pension systems see e.g. Munnell (2006).

5.5.2. Funding Status

The funding situation of US DB pension funds remained strained in 2011. By 2006/2007 US DB pension funds had successfully restored funding levels after the perfect pension storm of 2000 - 2003 had opened huge gaps. These gains were erased - first - by the asset losses in 2008. The assets of DB pension funds shrank by nearly 30 percent in 2008; losses amounted to roughly USD 1 trillion (Munnell 2008). Secondly, continuously falling interest rates sent liabilities soaring and drove pension funds to record deficits in 2011. Industry figures point to funding ratios of on average below 80 percent in an accounting perspective[150].

2008 marked the first year where the new funding requirements under the Pension Protection Act applied. In compliance with the new funding rules (for detail please see section 5.5.5.Regulation) companies increased their contributions to DB plans by more than 50 percent to USD 107bn in 2008 and further to USD 115bn in 2009 according the U.S. Department of Labor. Industry figures state a record level of contributions in 2010. These figures fuelled the political debate over 'artificially overstated' pension liabilities[151] and clearly underline the pro-cyclicality of current funding rules which demand companies to make extra contributions to their pension plan in times of economic crisis.

[150] Milliman, Pension Funding Study 2011, Available at: http://www.milliman.com/expertise/employee-benefits/products-tools/pension-funding-study/ , [accessed 01/06/012]

[151] American Benefits Council (2012), Available at: http://www.appwp.org/newsroom/2012/pr12-4.cfm, accessed 12/06/1212

5.5.3. Governance Structure

> '*The sponsor of a defined benefit plan is responsible for the investment policies and practices of the pension fund. The sponsor has a direct economic interest in the investment outcome, because better and more consistent performance results in lower cost and residual liability.*'(McGill et al., 2010)

McGill et al. (2010) defines pension fund governance as 'the system of oversight and decision-making that organizations create to carry out their fiduciary obligations'. US pension fund governance is deeply grounded in the principle of fiduciary duty. The pension fund is legally a trust managed by trustees. Trustees and other pension fund fiduciaries (including the financial service sector) must act in the exclusive benefit of the beneficiaries (Clark, 2006a). As fiduciary duty forms the fundamental principle of Anglo-American regulatory approaches, the regulation of pension funds' governance can therefore be seen as the fundamental aspect of the Anglo-American regulatory approach. ERISA fiduciary law defines status and responsibilities of fiduciaries. ERISA takes a broad approach to fiduciary status taking a functional term rather than focussing on the formal status of trusteeship. The multifaceted definition of 'fiduciary' involves all persons who either exercise control over the plan or provide paid advice to the plan or are responsible for the plan's administration (Langbein et al., 2010). The interpretation of ERISA fiduciary law rests with the Department of Labor. As the time of this writing, a major re-definition of the term 'fiduciary' is underway[152].

With regard to managing the assets of a pension fund, fiduciaries are required to act with prudence. In the United States, this principle of prudence evolved over time into

[152] On 22/10/2010, DOL published a proposed rule 'Definition of the Term 'Fiduciary'' which provoked strong resistance from the financial community because of the intended significant expansion of the scope of fiduciary advice. Available at: (https://webapps.dol.gov/FederalRegister/HtmlDisplay.aspx?DocId=24328&AgencyId=8, [accessed 01/06/2012]

what is termed ‘prudent expert principle’, which means that the decision-making of a pension fund manager is compared to the investment behaviour of other professionals rather than against that of ordinary people acting with ‘reasonable care and skill’ as under the ‘prudent person rule’ which applies in the United Kingdom. The interpretation of what defines an investment as ‘prudent’ lacks the denotation of ‘conservative investment’ it has in the United Kingdom. In the United States ‘prudence’ is interpreted along the lines of financial economics, i.e. maximising risk-adjusted returns. As a regulator put it: ’You want efficiency in the system and that is what ‘prudence’ really is.’

The governance structure of US pension funds clearly incentivises risk taking on behalf of the pension fund fiduciaries. As the US law allows representatives of the sponsoring company including the management to act as fiduciaries, pension funds can actually be operated by the plan sponsor and the interests of the plan sponsor are legitimate point of consideration in plan decision-making. DOL frequently interpreted that the interests of others than the beneficiaries may be taken into consideration as long as this is not detrimental to the beneficiaries. Although pension plans have their fiduciary boards and committees, there is ‘no gap between the sponsor and the pension plan’ according to interviewees. The company takes the decisions with regards to plan design, funding strategy and investment policy. On the one hand, this gives the pension fund direct access to the sponsor’s expert knowledge especially in the Treasury and Human Resources Departments, which is in line with the ‘prudent expert rule’. On the other hand, the goals of beneficiaries and plan sponsor might get closer aligned than they eventually are. Identity of sponsor’s management and pension fund’s fiduciaries bears potential conflict of interest and principal-agent problems. As was shown in section 3.3.3, the introduction of a Pension Insurance Fund, the Pension Benefit Guarantee Corporation

(PBGC), distorted the symmetric distribution of risks and rewards and incentivised high risk-taking.

5.5.4. Pension Plan Design

The archetypal DB plan is the final salary plan which promises members a retirement annuity equivalent to a certain percentage of their final salary usually further dependant on the number of years worked for the sponsoring employer. In 2011, less than 10 percent of full-time workers in the United States still had access to a final salary plan. The general shift in retirement provision towards individual accounts, which Zelinsky (2004) refers to as the 'Defined Contribution Paradigm', manifests itself not only in the general shift from DB to DC, but also in changing plan features within the defined benefit plan concept. In 2011, 22 percent of employees participated in a DB pension plan compared to 50 percent in a DC plan. 75 percent of all workers with access to a DB pension plan were covered by a traditional DB plan. Thereof, about half of the traditional DB plans were final salary plans; average salary plans increased to a market share of 15 percent. Plans based on dollar amount formula accounted for 30 percent of all traditional DB plans[153]. Here, the benefit is based on a dollar amount per month for each year of eligible service

Cash balance plans represent the most important form of the non-traditional DB plans. They steadily gained in importance reaching a market share of 23 percent in 2005 and remaining there in 2009. Cash balance plans combine features of DB and DC plans. The employer specifies a contribution and an interest rate on that contribution, which is

[153] U.S. Department of Labor, National Compensation Survey: Employee Benefits in Private Industry in the United States, March 2009, Available at: http://www.bls.gov/ncs/ebs/detailedprovisions/2009/basic_retirement.htm, [accessed 10/06/2012]

credited to a hypothetical individual account balance. The benefit is the balance of this account at retirement payable as a lump sum or the actuarially equivalent annuity (Langbein et al., 2010). Thus, longevity risk is shifted to the employee but investment risk stays with the employer. The specified interest rate on the contribution acts as a guaranteed rate of return for the employee regardless of the actual investment performance of plan assets. Cash balance plans qualify as DB in accounting terms, which diminishes their attractiveness from the standpoint of the sponsoring employer. But the conversion from a final salary plan to a cash balance plan instead of a DC plan saves the employer the costs induced by the termination of a DB plan and further retains access to possible excess assets (Roin, 2010). Most of the conversions from traditional DB plans to cash balance plans took place in the 1990s (Kapinos, 2011). The rising popularity of cash balance plans was impeded by legal insecurity created by a controversial legal ruling in 2003, which found that cash balance plans were inherently age-discriminatory[154]. Even though this was contradicted by a major ruling in August 2006 and further clarified by the Pensions Protection Act (2006), the legal uncertainty surrounding cash-balance plans was completely erased only with the release of new rules by the IRS in late 2010. Following the 2006 decisions, conversions to hybrid cash balance plans had slowly resumed, but the more common change was freezing the DB plan and replacing it by a DC plan[155]. Employers started in the early 2000s to close down DB pension funds; the share of DB pension funds being closed to all accruals ('hard freeze') increased to 20 percent in 2009[156]. According to a recent Greenwich report, closure of DB funds to new employees accelerated considerably among US corporate sponsors in 2010 and 2011 with close to 50

[154] Cooper v. IBM, 274 F.Supp.2d 1010 (S.D. Ill. 2003) Judge Murphy
[155] Towers Watson (2011). 'Prevalence of Retirement Plan Types in the Fortune 100 in 2011'.
[156] U.S. Department of Labor, 2011, Private Pension Plan Bulletin 2009, Available at: http://www.dol.gov/ebsa/PDF/2009pensionplanbulletin.PDF, [accessed 01/06/012]

percent of respondents answering in 2011 they had at least one closed DB fund compared to 20 percent in 2009[157].

Indexing of pension benefits is not legally required in the United States, although according to an interviewee 'it was somewhat market practice up to the mid-1990s'.

5.5.5. Regulation

The introduction of the Employee Retirement Income Security Act (ERISA) in 1974 marked the first comprehensive regulation of private pension funds in the United States[158]. It enacted rules to protect employee benefit rights, addressed tax issues, clarified standards for actuaries, provided pension plan benefit insurance and defined the responsible governing agencies respectively. Jurisdiction is jointly exerted by the Department of Labor and the Treasury Department. The Department of Labor is responsible mainly for protecting employee benefit rights, whereas the Treasury Department has jurisdictional authority over all tax issues and the provision of standards and qualifications for actuaries. The task of providing insurance to pension plan benefits was transferred to a newly erected agency, the Pension Benefit Guarantee Corporation (PBGC), which is a non-profit agency supervised by the Department of Labor.

But although ERISA was characterised as a 'massive and exceedingly complex piece of legislation' (McGill 2010), it marked only the beginning of intensive regulatory activity on pension funds, rendering US pension law increasingly complex. The Pension Protection Act (PPA) 2006 is the latest milestone in this regulatory history and the most comprehensive change to the regulatory environment to employer-sponsored pension

[157] Greenwich Associates (2011). 2011 United States Investment Management: Public Pensions Market Trends.
[158] This section draws on McGill et al. (2010).'Fundamentals of Private Pensions'.

plans. Signed into law by President Bush on August 17, 2006, the main changes to DB pension funds concern the funding rules which were enacted stepwise between 2008 and 2010.

Prior to the PPA, US employers used to have considerable leeway in the decision how to fund their pension plans, which led academics to conceptualise funding as a an economic decision of the employer (Fabozzi et al., 2005). It can therefore be concluded, that funding was traditionally not at the heart of pension regulation. In a report published in May 2005, the Government Accountability Office (GAO) carefully analysed the funding and contribution behaviour of the largest DB funds and – having depicted the weaknesses of the former funding rules - recommended 'broad pension reform that is comprehensive in scope and balanced in effect'[159]. Criticism focused on employers' scope for discretion in choosing the actuarial assumptions in calculation pension assets and liabilities, as well as the legal situation allowing sponsors not to make any cash contributions to their underfunded pension funds and still satisfying the minimum funding requirements. The GAO focused on the implications for the PBGC, whose deficit had risen strongly since the turn of the millennium. Although the PBGC is not backed by a Government guarantee, there was widespread concern that a state bail-out of the pension system comparable to the Savings & Loans crisis might become politically unavoidable with considerable cost to the tax payer,

Protecting the PBGC - and finally the Government - was one motivation behind the PPA (Warshawsky, 2007), as its two main components regarding DB pension funds,

[159] United States Government Accountability Office, Private Pensions: Recent Experiences of Large Defined Benefit Plans Illustrate Weaknesses in Funding Rules, Available at: http://www.gao.gov/new.items/d05294.pdf, [accessed 01/06/012]

namely tougher funding rules for all private DB pension funds and the temporary relief measures for the airlines industry which was threatening to further significantly increase the PGBC's deficit, both provided relief to the agency. Addressing excesses and abuses in the system was given by interviewees as further main motivations of the new pension law. Not addressed by the PPA was the topic of the reversion of surpluses, which is effectively prohibited under U.S. law due to punitive excise taxes[160]. The non-reversibility of the surplus in combination with a strict upper tax limit on pension fund assets traditionally discouraged employers from fully funding their pension funds (Pang and Warshawsky, 2007).

A market participant summarised the new funding rules loosely as: 'The new law tries to get you to 100 percent in seven years, the old rule tried to get you to 90 percent in three to six years'. In general, the PPA considerably strengthened funding requirements and linked the provision of new benefits to the funding status. In more detail, the funding rules for single-employer pension funds can be summarised as follows:

- Plan sponsors have to amortise shortfalls within seven years. The goal is to be 100 percent funded of the accrued liability in an ongoing valuation.
- The applicable actuarial assumptions are closely prescribed by the administration: The liability must be discounted with corporate bond yields, either the full rate curve or in three segments with two-year smoothing. The Department of Treasury provides an improved mortality table.

[160] As was pointed out by interviewees, given a history of abuse of surplus reversion during the mergers & acquisitions of the 1980s, it was regarded as politically unacceptable to give plan sponsors recourse to surpluses.

- Smoothing is restricted to a two-year smoothing of plan assets and the discount rate.

Furthermore, pension funds which are below 80 percent funded are qualified as 'at risk' at must increase the contribution. Very poorly funded plans, which are less than 60 percent funded, are prohibited from further accruing pension benefits. This marks the first time that beneficiaries are directly affected by the funding policy pursued by their employer (Warshawsky, 2007). The ramifications of the PPA were expected to be most significant with regard to employers' risk management.

The implementation of the new PPA rules coincided with the Global Financial Crisis. As soaring funding gaps had required rising contributions during the economic downturn, policymakers decided to provide pension funding relief. The Pension Relief Act of 2010 extended the seven-year amortisation period for funding shortfalls. Employers can choose between the 'Two-Plus-Seven Relief Option' under which the amortisation period can be extended to nine years with lower payments in the first two years, and the '15-Year Relief Option' under which the regular funding policy can be extended up to 15 years. Further funding relief was granted in 2012 in the form of pension interest rate stabilisation. The segment rates are now calculated as an average over 25 years with an additional corridor thus eliminating exceptionally low or high interest rates.

5.5.6. Investment Strategies

'To maximise returns and to protect the sponsor' are according to market participants the two dominating investing goals of pension funds. When questioned if this

is always in line with the fiduciary duty of trustees, the interests of sponsor and beneficiaries were stated to be closely aligned with respect to investment.

The traditional investment strategy of US pension funds was a balanced strategy, which consisted of 60 percent equity and 40 percent fixed income, which is according to a pension consultant still widespread. Drawing on what is observable in the markets, pension funds geared up considerably after the turn of the millennium. The equity expose of around 60 percent remained mostly unchanged in nominal terms, but the domestic investment was reduced in favour of international equity, thereby partly reducing the famous 'home bias' of US institutional investors. Investment in fixed income was also reduced to below 30 percent. Instead, public and corporate pension funds shifted assets to alternative investments, especially private equity and equity real estate, thereby following the investment behaviour of the large endowments. Taken into account the parallel surfacing of partly large deficits this investment behaviour could be conceptualised as 'gambling against resurrection'. Neither external regulation nor internal governance rules prevented pension funds from increasing the investment risk when facing funding deficits. As US accounting rules allowed for discounting liabilities with the expected rate of return, this policy helped to reduce deficits by increasing the portfolio of riskier assets promising higher returns thereby at the same time lowering liabilities. The gamble paid off nicely, as pension funds recovered by benefiting from strong returns on equity and alternatives between 2003 and 2006. Taken into account the put option provided by the PBGC, the actual risk taken by sponsors was limited. The investment behaviour between 2003 and 2006 can therefore serve as an example for the asymmetric nature of the governance rules regarding risk taking, which prevails in the United States.

2007 may have marked the beginning of the next era of new 'investment paradigm'. The Greenwich[161] report highlighted the starting implementation of new investment products and strategies.

> '*It is a completely new world. This is the world of absolute return, portable alpha, and liability-driven investment. All of a sudden, in a very short period of time, this big, stable, slow-moving industry may be completely shifting gears*'

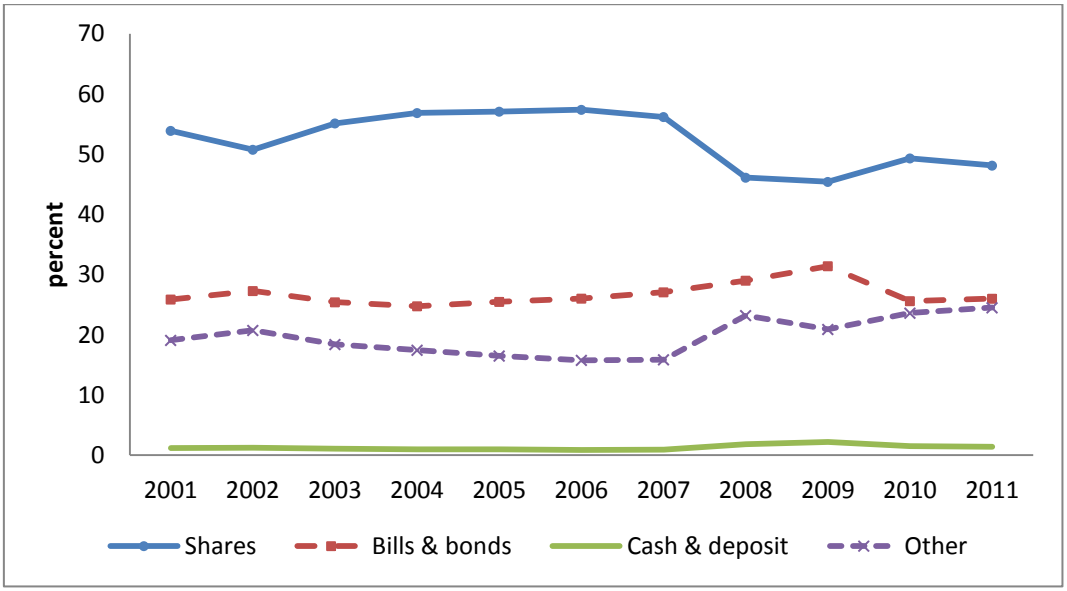
These changes in the investment behaviour can be attributed to the new accounting rules and the changing regulatory framework. This was confirmed by the interviews. The interviewees differed though in their evaluation of the impact of regulation versus accounting. Some claimed PPA in be the main driver of de-risking, for others it were the changes in accounting. LDI strategies have arrived at the doorsteps of US pension funds, with the DOL legally paving the way. In an 'advisory opinion under ERISA' the DOL's Division of Fiduciary Interpretations stated that a fiduciary would not violate their duties 'solely because the fiduciary implements an investment strategy that takes into account the liability obligations of the plan and the risk associated with such liabilities and results in reduced volatility in the plan's funding requirement'[162]. A market participant commented, that 'LDI has not been tested in the courts'. Following anecdotal evidence from interview, especially smaller companies with pension liabilities that are high compared to the sponsor's market capitalisation and closed pension funds implement LDI strategies as part of the risk management. De-risking seems to have continued in

[161] Greenwich Report 2007: New Products and Strategies Shake Up 'Traditional' Asset Allocation for U.S. Institutions

[162] U.S. Department of Labor, EBSA "Advisory Opinion on behalf of JPMorgan Chase Bank, N.A., 2006-08A ,ERISA SEC, 404(a). Available at: http://www.dol.gov/ebsa/pdf/ao2006-08a.pdf, [accessed 01/06/012]

2008 at corporate pension funds. Minimising pension volatility and increasing the predictability of pension contributions was the overriding goal for corporate sponsors[163].

Figure 5.4: Pension fund asset allocation for selected investment categories: United States



Source: OECD, GPS (for methodology see table 3.1)

But according to the OECD Global Pension Statistics, US pension fund still had an equity allocation of around 50 percent in 2010 which makes it the highest of all OECD countries. This underlines industry reports that US pension funds are more cautious shifting to low-risk but also low-return investment strategies. Plan sponsors seem to look for an improved funding situation to make de-risking strategies more affordable. A Greenwich 2011 report confirmed that 'the need for returns has generally trumped the need to take down risk'[164]. Accordingly, US DB pension funds generally stayed in

[163] Greenwich Associates (2009). Managing Crisis: U.S. Institutions Roll Out Their Responses to Global Downturn.
[164] Greenwich Associates (2011). 2011 United States Investment Management: Public Pensions Market Trends.

alternative asset classed with on average 20 percent of their portfolios invested in hedge funds, private equity and real estate.

Outsourcing of the investment process seems to have become a firm trend as investment strategies and administrative management of plans get more complex. The applied concept is a manager-of-manager approach under which a large investment company takes over the investment process whereby the outsourced parts can be individually agreed. The pension fund may retain the decision on the strategic asset allocation but assigns the investment company with all other duties including manger selection at own discretion. This approach bears many similarities with the Dutch 'fiduciary management', only that (not yet) as many components of the investment process get outsourced. The reasons for the outsourcing are mainly costs, and can be found in the increasing complexity of investment in the context of regulation and accounting as well as in a shortfall of in-house resources at the sponsor. If the contracts are well written to properly handle the inherent principal-agent relationship this would lead to a further professionalization of asset investment and pension fund management in the United States.

5.5.7. Risk Management

> *'What has changed is that the market now accepts that defined benefit plan investment decisions must be made in the context of their potential liability risks and rewards, not a traditional Modern Portfolio Theory (MPT) asset-only context.'* (McGill et al., 2010)

As in other countries, risk management is clearly linked to the size of the pension fund as size rules available resources. Furthermore, pension fund's risk management can be regarded as being integrated part of the sponsor's risk management as the pension fund is usually integrated into the financial framework of the company. ALM studies are

nowadays conducted as a matter of routine, but not historically so. According to the expert interviews, ALM studies were mostly conducted every four to five years by external consultants. It was mostly commented that the strategic asset allocation is based on the results of the ALM study, 'but not one to one'. Even large pension funds applied what they consider 'risk management' to the asset side only in the form of efficient frontier analysis. Risk budgeting was not common practice.

Since the GFC, U.S. pension funds have become much more risk-conscious. According to Greenwich Associates 20 percent of corporate funds spend more time on risk management since the outbreak of GFC, about a third each had added a liability-driven investment concept and increased the duration of the fixed income investment. But nearly half of the surveyed corporate pension funds had not implemented any changes to their governance[165].

In general, the risk tolerance is set by the finance department and informed by the new funding and accounting rules as well as by the market experience since the turn of the century. The relative size of the pension liability compared to the company's market capitalisation, the funding situation of the pension plan and the overall economic situation of the sponsor are the parameters in which sponsors decide the pension funds' risk exposure. Whereas large and well funded pension funds with strong corporate sponsors can usually conduct their investment strategy independently of corporate risk management requirements, the situation is significantly different for smaller companies which cannot 'afford to take a hit'. According to one market participant, 'the main

[165] Greenwich Associates (2011). 2011 United States Investment Management: Public Pensions Market Trends.

measure of risk management was freezing the plan. The second was to implement a liability-driven tool'.

5.6. Conclusions

This chapter provides the background information on employer-sponsored DB pension fund systems in Germany, the Netherlands, the United Kingdom and the United States. We provided statistical evidence on the context of the markets, described funding status and outlined governance structures and plan design. This is followed by an overview of pension fund regulation. Finally we described investment strategies and risk management practices. Even though there are clearly common trends observable, DB pension fund systems are deeply rooted in their national traditions distinguished by different legal systems and embedded in different economic structures.

Chapter 6: Conclusions

6.1. Introduction

The topic explored in this thesis is the impact of regulation on the asset investment of occupational defined benefit (DB) pension funds in an attempt to better understand pension investment risk taking and its implications. There is little doubt that this topic has become of pivotal importance for pension funds, their sponsors and beneficiaries as well as for pension fund regulators and the broader public policy agenda given the disastrous impact of two financial crises since the turn of the millennium. There is hardly one day without pension funds being criticised for taking too much investment

risk or for poor risk management techniques by academics and governments (Frijns, 2010; Sender, 2010) as well as from industry voices (Halim, 2010) and the business press. The crisis is found to have 'changed pension funds' attitude towards governance and risk management'[166]. This thesis offers insights into the practice and development of pension funds' practice of investment risk management. We ask the questions 'how do they do it' and 'why do they do it the way they do it' to gain a deeper understanding of the underlying norms that contextualise investment decision-making at pension funds. As we do this in a comparative cross-country analysis covering Germany. Netherlands, United Kingdom and United States we focus on the differences in the historically inherited systems in which investment decision-making at pension funds in these countries is embedded.

We build this thesis on one insight and two observations as the starting point: First, risk taking is a necessary and important ingredient in pension provision. DB pension funds, which give their members the safety of a pre-defined pension benefit, are inevitably active risk takers as both investment returns and mortality trends are uncertain. Since Markowitz, financial economic theory conceptualises the investment-decision in the dual dimensions of risk and expected return: Aspiring for higher investment returns necessitates higher risk taking but is rewarded by lower costs of funding the pension plan. The funding costs are mainly determined by the investment performance of the portfolio (Blome et al., 2007). The investment decision is one of the most fundamental questions in pension economics (Davis, 2000; Koedijk and Slager, 2010). Building on these

[166] *IPE, 'Crisis changed pension funds' attitude toward governance',* Available at: http://www.ipe.com/news/crisis-changed-pension-funds-attitude-toward-governance_38296.php?s=risk%20management, [Accessed 08/12/2010]

cornerstones of financial economics we theorise the investment decision in the grounds between efficiency and safety. 'Too much' investment risk taking jeopardises the safety of the pension promise; 'too little' investment risk taking increases the costs of pension provision. Safety comes at an economic price.

Second, we observe different patterns of risk taking which can be clustered on a national scale, and third, we note that DB pension funds have started to de-risk their investment portfolios. We therefore inquire into the drivers of the investment decision-making process at DB pension funds. The investment decision is informed by the risk attitude of the decision-makers at pension funds and further shaped by their investment beliefs based on the prevailing investment paradigm. We theorise the practice of allocating portfolios between the core asset classes stocks and bonds as indicator of the risk attitude of the decision-makers at pension funds. Investment-decision making is contextualised (Clark and Strauss, 2007). The regulatory environment is a key determinant for pension fund management (Fabozzi et al., 2005). We investigate how investment risk taking is shaped by the regulatory environment. In doing so, our research is focussed, first, on the impact of the concrete regulatory regimes and, second, on the impact of the legal context of pension funds' governance structures on the investment behaviour of employer-sponsored DB pension funds. The impact of international accounting rules on occupational pension provision is subsumed in the chapter on regulation and not separately treated. We thus analyse two big building blocks, namely pension fund regulation and pension fund governance, in a comparative perspective.

We combine the methodologies of economic geography with the insights from welfare theory, financial economic theory and contract theory to analyse pension funds'

investment behaviour from different angles in order to develop a deeper understanding of investment risk management. Drawing on welfare theory we contextualise DB pension funds in the broader pension landscape which is itself transformed by demographic, economic and societal change. Here we build on the work of G. Esping-Andersen to lay out the bounding concepts for the evolving institutional change. In a historic perspective, this thesis researches the changing pattern of pension provision. I build on the work of G.L. Clark in understanding the transformative powers of economic change on pension funds. We note a changing conceptualisation of pension funds which may well foreshadow a further de-risking of pension funds thus implicating higher costs of pension provision looking forwards.

Drawing on financial economic theory we research investment risk management at DB pension funds and the impact of pension fund regulation on their asset investment. We trace the intertwined evolution and dissemination of theory and practice of financial risk management and financial regulation through the different sectors of the financial industry. We note how risk taking is shaped through the intersecting forces of theory, market and regulation. We find evidence that, first, the regulatory rules induce an investment behaviour that deviates in a suboptimal way from the reigning investment paradigm. Second, the regulatory regimes have turned more risk-averse, encouraging pension funds to lower their risk-profile.

Noting more subtle influences we make the attempt to dig into the deeper layers contextualising decision-making and explore into pension funds' governance structures. The 'nexus of contracts' as developed by Coase, Fama, Jenssen and Meckling serves as theoretical anchor points for analysing the agency problems at pension funds. We take the

contrarian view on pension funds as developed by Langbein and further applied by Sitkoff and Besley and Prat. We map the risk attitude of sponsors and members of DB pension funds under the various pension plans we observe in the different countries and ground them in their specific legal and regulatory context. This serves as the starting point to explore the regulation of governance and its impact on pension funds' investment decision-making.

This thesis is based both on qualitative and quantitative research methodologies. I apply the methodology of close dialogue developed by economic geography to conceptualise the respective pension fund systems and pension fund regulation systems. Second, we apply a stochastic model grounded in financial economic theory to calibrate the impact of different regulatory approaches on pension fund investment.

I started this research in 2006 when the implications of the 'perfect pension storm' were the overriding topic in the pension industry and continued throughout the Global Financial Crisis and into the euro crisis. As such I witnessed shock waves the crises sent through the pension fund systems. My expert interviews were mostly conducted between 2006 and 2008 and therefore reflect mainly the time between two major financial crises. But I believe that the information derived from these expert interviews still forms a valid reference point for assessing formation and promulgation of investment risk management approaches.

This concluding chapter is laid out in the following manner: The next section will provide a restatement of the finding of my research and will critically examine them against the research questions initially proposed in my thesis. The third section will take up the contribution this thesis makes to the academic literature. The fourth section will

discuss policy implications the findings of this thesis may have for pension fund regulation. And, finally, we will point out directions for future research.

6.2. Restatement of findings

I examine the changing risk attitude at DB pension funds under three overarching questions. The first question inquires the consequences of the demographically, economically and societal induced transformation of pension systems for DB pension funds. Second, we inquire into practice and drivers of pension funds' risk management and ask the question if the risk-taking capacity of DB pension funds is impeded by pension fund regulation and accounting. The third question asks if governance matters for investment decision-making of pension funds. Can we find evidence for our thesis that the risk appetite of the decision-makers at pension funds is grounded in nationally diverging governance structures and thus legally embedded? Each of the three main parts of this thesis provides evidence for answering these questions. The appendix further supports the findings of chapter 3 and 5 on investment risk management.

I provide descriptions of the pension systems in the four countries at various parts of this thesis: In chapter 2 we include an overview of the overall pension systems and the main pension reforms. A detailed analysis of the risk-sharing mechanisms of the observed pension plans is given in chapter 4. Chapter 5 provides the background details on the DB pension fund systems in the single countries structured into the separate sections context, funding status, governance structure, pension plan design, regulation, investment strategies and risk management.

Chapter 2 contextualises DB pension funds within the changing pension landscape in a welfare-theoretical and historical perspective. We use the literature review

to set the stage by mapping the demographic and economic forces which transform the pension landscapes. Although global in nature, these powerful forces of transformation are neither uniform nor even. The ramifications for national pension systems depend on the historically inherited structures shaped by the dominating welfare paradigm which is formulated on a national scale. Significance and understanding of DB pension funds is informed by the public-private pension mix which Esping-Andersen identified as an important criterion for classifying pension systems. We survey the literature on the historical development of the pension systems in the different countries and share the view that the public-private mix and the observed differences in pension systems are deeply rooted in history.

We identify demographic change as the main force driving the transformation of the pension systems in the continental European countries. We summarise the literature debating the relative superiority of a PAYG versus a funded pension system which theoretically underpinned pension reforms in large parts of the European Union epitomised here by Germany. The privatisation of parts of the formerly public pension provision changes the public-private pension mix in the conservative welfare states of continental Europe. This evolving 'New European Pension System' is characterised by a dualism of state-based and market-based pension provision under a close web of regulation. The strong involvement of the state sets them apart from the traditionally liberal approach in the Anglo-American countries. The 'New European Pension System' seems thus to follow more the lines of the Netherlands. The 'New European Pension Funds' although private in nature are conceptualised as integral part of state pension policy: They have the political agenda to fill the pension gap opened by the retreat of the state. We conclude these pension funds are 'doomed to growth' but their social policy

agenda will inform governance and risk attitude differently from the familiar DB pension funds.

Economic change reinforced by regulatory change transforms the Anglo-American pension systems driving the change from DB to DC. We provide a synopsis on the literature discussing challenges of DC plans rooted in the shortcomings of individuals' decision-making and the solutions discussed under the headline of the 'new paternalism' looking forward. We note that the public-private pension mix is under debate also in Anglo-American countries although in diametrically opposite direction than in continental Europe, namely more state rather than less. Given the rapid closure of DB pension funds especially in the United Kingdom, these pension funds are 'doomed to exit'. From the theoretical perspective of both pension investment and pension governance a continuation of the observed de-risking is the plausible scenario looking forward.

From these intertwining transformative changes we gain two important insights: First, the geographic dynamics of pension fund capitalism will shift from the Anglo-American world to continental Europe. Second, the different welfare agenda of the 'New European Pension Funds' sets them apart from the traditional DB pension fund and requires the formulation of a coherent regulatory response and a re-design of pension risk and cost sharing.

We theorise pension fund regulation from different angels: First, in the introductory chapter we contextualised pension fund regulation in the changing landscape of financial regulation in the aftermath of this year financial crises. We critically examine pension fund regulation against the findings of a group of scholars around C.A.E.

Goodhart researching banking regulation. Second, chapter 5 proceeds by exploring the impact of pension fund regulation on pension funds' risk management. In this chapter we include a detailed description of pension fund regulation in the single countries. Third, further insights are drawn from the quantitative modelling in our ALM exercise. We summarise our findings as follows: First, we found evidence of cross-sectored evolution and dissemination of the principle of risk-based regulation starting in the banking industry, continuing to insurance industry and finally arriving in the pension fund industry. While important lessons can be learnt from the academic research on banking regulation, we also found evidence that principles and practices are not always well aligned to the specifics of pension funds. We will explore this topic in more detail in the next section on policy implications.

Our second research question inquires into the forces that drive the practice of risk management at DB pension funds and analysis the impact of pension fund regulation and accounting. Chapter 3 defines pension fund risk management as a quantitative model-based process based on the pricing of risk. Quantitative risk management was developed in close interaction between financial economic theory and capital markets, progressed by technological advances and shaped by regulatory events. We trace the evolution and dissemination of financial risk management through the different sectors of the financial industry. We thus place pension funds' risk management firmly in the broader context of financial risk management and are able to gain important insights from the broader perspective. We note that pension funds' risk management turned more professional and sophisticated applying increasingly modern quantitative risk management models. While it seemed to be a welcoming finding that pension funds started to leave opacity and join the modern risk management revolution that transformed the financial industry (Kocken,

2006) we also observe contradictions and inconsistencies. The insight that risk is a relative and not an absolute concept (Balzer, 1994) contradicts any notion of uniform risk management systems which can be universally applied to all kinds of financial investors. Consistent and coherent risk management requires as the starting point a well-defined taxonomy of risk factors which we found missing for DB pension funds.

Chapter 3 continues by exploring more fully two change drivers of pension funds' risk management thereby drawing theoretical support from the ALM modelling exercise in the appendix. The first driver is the arrival of the fair value principle at pension funds. The second change driver is the overhaul of pension fund regulation under the banner of risk-based regulation and the supremacy of solvency as regulatory policy instrument. Chapter 3 summarises the development of pension funds' valuation in a historical perspective, critically examining its theoretical foundations and practical implications. We engage in the controversial debate surrounding the fair value approach applied to DB pension funds. We support our critical view with the results from our modelling exercise where we demonstrate how different valuation methodologies change the characteristics of the pension liabilities. We find three important implications: First, the valuation methodology matters as it significantly impacts the intertemporal allocation of pension funds' funding cost, risk sensitivity and thus the choice of investment strategies. Second, there is no consent at present how to evaluate pension funds. Regulators, accountants, pension funds and their sponsors all use different methodologies thereby diluting the required clarity of goals (Clark and Urwin, 2008a) for management purposes. Third, the fair value approach changed the perception of risk at DB pension funds and shortened the investment horizon of pension funds.

These implications are to some extent reinforced by our findings regarding pension fund regulation: First, the concept of solvency evolved as undisputed core regulatory instrument. Funding rules or principles were defined to ensure that pension benefits can be paid under adverse conditions. Given the lack of an undisputed methodology for pension fund valuation it is unsurprising that funding rules are internationally not compatible. 'Fully funded' means very different things in different countries. Second, regulations impact funding costs by inducing the choice of second-best investment strategies. The impact of quantitative regulations is obvious as they restrict the available choice of asset classes and investment strategies. The impact of funding rules is more subtle. Our quantitative modelling exercise showed that the impact of funding rules depends on their time horizon ('fully funded at all time' versus 'fund-specific funding') and the choice of the discount factor. We also pointed out the negative impact of pro-cyclical funding rules as they increase the need for liquidity reserves and thus reduce the return potential of the portfolio.

At this point we can conclude that the observed changes in pension fund regulation and accounting contributed to the fading paradigm of the pension fund as long-term investor thereby undermining the most important theoretical argument favouring equity investments of pension funds. Campbell and Viceira developed the theoretical framework of strategic asset allocation differentiating between short-term and long-term investors concluding that long-term investors should allocate more assets to equity than short-term investors. Thereby they contributed the importance of the time horizon to the debate of pension investing. The recent changes in pension fund regulation and accounting shortened the investment horizon of pension funds and thereby encouraged

the observed de-risking of pension funds' portfolios which will inevitably further increase the cost of pension provision.

Our third research question relates to the impact of governance on pension funds' investment decision-making. We recognised that regulation alone provided an insufficient explanation for the observed different patterns of investment risk. In chapter 3 we made a first attempt to explain differences in investment risk taking by different governance structures. Chapter 4 takes this discourse further and theorises pension fund governance from a contract-theoretical perspective. We build mainly on the work of Ambachtsheer and Clark and Urwin who firmly established pension fund governance as an import factor for the performance of pension funds, researched shortcomings and offered best-practice solutions. We research the interaction between patterns of governance and the risk-taking of employer-sponsored DB pension funds in order to better understand the observed decision-making in a comparative analysis. We start our argument with a close review of the controversial debate in financial economic theory on pension fund investment and funding. We summarise the debate between integration and separation theory ranging between favouring an all-bond and all-equity portfolio in chapter 4. We identify as the focal point of this debate the question if the pension fund is an integral part of the sponsoring company which possesses decision-making power or not. We thus identify specification and distribution of decision-making rights as a further important factor influencing the strategic asset allocation. We find evidence that this differs between the countries and further developed over time. We conclude that the problem of pension fund investment and investment risk taking is not solvable in a global setting but needs to be answered in the specific national legal context.

We proceed with an analysis how the risk attitude of the decision-makers is shaped by property rights thus adding a legal dimension to our research. Here, we first present a synopsis of the relevant literature on both pension fund governance and contract theory. From this starting point we develop a contract-theoretical analysis of pension fund governance building on the 'nexus of contract' view of the firm as developed by Coase, Fama, Jenssen and Meckling. We make the argument that the decision-making process at pension funds is characterised by a dual agency problem with two main principles namely members and sponsor. We stay in the neo-classical theory by assuming that people are generally risk-averse. We further identify 'recourse to the sponsor' and 'recovery of surplus' as the two important drivers of the principals' risk attitude. The legal rules and practices regarding both pension fund's recourse to the sponsor and sponsor's access to surplus assets differ considerably between the countries.

We examine the theoretical results against the observed reality in the analysed countries. Our results confirm that governance matters in investment-decision making. We find the Dutch governance structure to be risk-neutral which is consistent with the balanced investment policy we observed. In the Netherlands, we identify the new solvency regime as exerting the main impact on risk management strategies. The risk-averseness of German 'Pensionskasse' is based in the asymmetric risk-reward distribution of hybrid pension plans and further supported by a risk-averse regulatory regime. The US governance structure encourages in principle risk-return optimisation policy but the not-risk adjusted pricing of the PBGC encourages excessive risk taking. The strongest impact of governance structures could be identified in the United Kingdom: Regulatory changes prioritised the interests of the employees above the interests of the employers. The observed de-risking of pension funds occurred parallel to the changing governance

structure[167]. Pension fund regulation in the United Kingdom can be characterised as regulation of governance.

6.3. Contribution to literature

My thesis on the impact of regulation on the asset investment of defined benefit pension funds contributes to the literature in three ways:

First, I contribute to academic studies on 'comparative pension systems'. Throughout this thesis we refer to the extensive academic research on national pension fund systems. The three countries which host large DB pension funds have all sponsored academic research centres on pension fund studies. But there are relatively few studies taking a comparative perspective. We would argue that this state of academic research reflects the fact that pension funds are deeply nationally embedded. Thus knowledge is nationally clustered. We would further extend the argument that serious misunderstandings can arise from attempts to formulate solutions to global problems pension funds face without paying sufficient attention to local specifications. This thesis contributes to developing a deeper understanding of the different conceptualisation of pension fund systems in the here analysed countries. We build on the work of G.L. Clark on comparative pension systems and extend it by adding a perspective on investment risk management in the context of regulation.

Second, my thesis contributes to the literature on pension fund regulation in twofold ways. First, we contribute to the literature by undertaking a cross-country or rather cross-system analysis. We build in our work strongly on information provided by

[167] We are aware that we cannot build an academic proof of causation on the parallelism of two observations especially given the multiplicity of factors affecting pension provision.

the OECD, which offers considerable and detailed research on pension fund regulation in a comparative perspective and is also the owner of the only international pension fund statistic. We add an analysis of the impact of regulation on the asset investment. While some studies address this topic in a national context, our project, the results of which are summarise in the appendix, represents up to our knowledge the first attempt to quantify the impact of specified regulatory measures in a cross-country analysis. The combination of quantitative and qualitative research methods allows us to develop a deeper insight into the granulate working of pension fund regulation as the qualitative results were used as ingredients for building the model and the quantitative results could be further grounded in what we learnt from the expert interviews. The combination of the methodologies from economic geography with financial economic theory strengthens the reliability of our findings. Second, anchoring our analysis of pension fund regulation in the broader context of financial regulation enables us to critically examine pension fund regulation against the academic literature on banking regulation, to explore communalities and point out differences.

I contribute to the literature on pension fund governance by providing a contract-theoretical perspective. The interaction between patterns of governance and risk-taking of pension funds is under researched up to now. This thesis aims to close that gap. We revisit the principal-agent debate from the perspective of corporate finance. While Besley and Prat developed a general framework, we inquire into the historically grown legal roots which define property rights. Thus, we are able to theoretically underpin the observed patterns of investment risk-taking and the observed changes of these patterns.

By taking a multidisciplinary view on pension funds drawing on welfare theory, financial economic theory and contract theory we were able to present a more complete picture of DB pension funds than each discipline in itself.

6.4. Policy implications

The Global Financial Crisis drives the search for a new mode of financial regulation. This holds true above all for the banking industry which was at the heart of the financial crisis but also for pension funds which were dramatically impacted. Pension fund regulators have not yet found a coherent answer to the challenges they face. Even the short-term reactions to the crises differed to a considerable degree between the single countries as was recently summarised by the OECD (Antolín and Stewart, 2009), long-term challenges are being loosely addressed but a coherent strategic response is outstanding. This refers not only to the consequences from the Global Financial Crisis but more fundamentally to the transformation of the pension landscape by demographic, economic and societal change.

While this thesis clearly falls short of the challenging task of providing a best-practice template for pension fund regulation, some important insights might be gained: We are very supportive of the point raised by the OECD that 'regulation relating to voluntary pensions needs to be considered in the light of the pension system as a whole' (Antolín and Stewart, 2009). We make the argument that DB pension funds need to be re-conceptualised in the changing pension landscape. This is not without repercussion for pension fund regulation. The agenda of pension fund regulation needs to be formulated in the context of the broader pension policy. Three important questions need to be answered: The first refers to the public-private mix of pension provision thereby contextualising

pension funds in a welfare perspective. The second question refers to the efficiency-safety mix in pension provision against the background of population ageing; the third question, closely interrelated, refers to the design of pension risk and cost sharing.

The first question relates to the goals of pension fund regulation which need to be consistent with the goals of pension policy. The formulation of a comprehensive pension policy including all sectors of pension provisions is helpful. Such an exercise, which is policy routine in the Netherlands and Germany, is missing in the United States and has rather recently been undertaken in the United Kingdom. When the role of occupational pension funds in a welfare perspective is left undefined, pension fund regulation is left in a political conundrum what implies the risk that goals and practices of pension fund regulation are ill-aligned with social policy goals. A comprehensive pension policy needs to answer the second question on the efficiency-safety mix. Global ageing requires cost-efficient systems of pension provision. Cost-efficiency requires risk taking. The question is who should shoulder pension risk? This relates already to question 3 on the design of pension risk and cost sharing. In all four countries reviewed in this thesis we observe a continuing process of transferring pension risks from the employer to the employee, even though there is mutual consent that the employee has the lowest risk-taking capacity of all stakeholders, that the household is ill-equipped to master investment or longevity risk. In the Anglo-American countries where companies withdraw completely from pension risk-taking by closing DB pension funds, pension policy focuses on strengthening the risk-bearing capacity of private households by means of improving standards of financial literacy. In the continental European countries this process is more incremental by re-designing the pension promise and shielding the employee by additional guarantees.

We propose here to strengthen the link between pension policy and pension fund regulation in order to facilitate a coherent formulation and implementation of pension policy. Macro-prudential regulation might be helpful in this respect. In the introduction we critically examined the goals of pension fund regulation against the theoretical framework of financial regulation as developed by C.A.E. Goodhart. There we made the point that the rationale of pension fund regulation is usually not very clear. Protection of members' benefits ranks high in all jurisdictions, although the degree to which also the interests of the employers are taken into account differs considerably between the countries as is demonstrated in chapter 4. We further outlined the regulatory concept of the Netherlands, which explicitly follows a macro-prudential goal, i.e. contributing to the financial stability of pension funds. This constitutes a rare example where rather abstract welfare goals are substantiated into concrete regulatory instructions. In our opinion, this represents a necessary and important ingredient in the formulation of a coherent regulatory response to the challenges of pension provision looking forward.

The high percentage of closed DB pension funds in the United Kingdom and the United States underlines the need for introducing a macro-prudential or systemic risk component as they are faced with the risk of the disappearance of the traditional DB pension fund sector. This holds true for the United Kingdom in particular where the introduction of the 2004 Pensions Act is seen as having the unintended and serious consequence of undermining occupational pension provision (Byrne e al., 2006). As the pension system in the United Kingdom is characterised by the highest reliance on voluntary funded pension provision of all OECD countries the impact is especially grave. But also in Germany pension fund regulation seems to be not well aligned with the broader welfare agenda. The highly risk-averse approach of BaFin may have been in line

with the low importance of occupational pension funds in German pension provision pre-pension reform, and we recognise that it served well in successfully shielding German pension funds from the disastrous impact of the Global Financial Crisis. Notwithstanding, we would doubt the appropriateness of the regulatory approach post-pension reform as the German pension reform formulated a growth agenda for pension funds. Subsequently, many pension funds were newly founded. There is general agreement that young, immature pension funds can take more investment risk and a more lenient approach to funding than mature funds. On these ground we would question if the German pension agenda can be successfully implemented in the current regulatory environment and would favour a more accommodating regulatory attitude

On a more technical level, regulatory instruments and methods may be critically questioned. This refers to the supremacy of funding rules as regulatory instruments and the adoption of the fair value approach for valuation purposes. Especially in combination, the ramifications were to amplify the impact of financial and economic cycles and to end the paradigm of the long-term investor. The widely voiced criticism with regard to the pro-cyclicality of funding rules further aggravated by the use of market prices for valuating pension funds' assets and liabilities was recently taken up by the OECD who proposed to implement counter-cyclical funding rules and encouraged regulatory authorities to depart to some degrees from the application of market prices(Yermo and Severinson, 2010). The proposed amendments would represent incremental change but without departing from the regulatory principle of risk-based regulation and as such follow the recent trends in banking regulation. Quantitative model-based risk management and regulatory approaches are evidence of cross-sectored dissemination disrespecting the characteristics that differentiate the different types of financial

institutions. Basel II-style regulation transferred as Solvency II into the insurance sector of the European Union but was only in selected EU countries applied also to occupational pension funds. While value-at-risk might capture the short-term liquidity risk relevant for investment banks it is not an adequate risk indicator for pension funds which are predominately faced with long-term longevity and investment risk. DB pension fund liabilities are characterised by long-term contracts specifying claims and mapping the risk profile. Therefore, risk management systems and concepts initially developed for investment banks must be ill-fitting for DB pension funds. Furthermore, theoretical and practical risk management concepts for DB pension funds cannot be easily transferred internationally given their diverging risk map of pension risk.

More fundamental critic at the principle of risk-based supervision was voiced by a group of scholars around C.A.E. Goodhart. Danielson, Shin and Zigrand formulated the principle of the endogenous nature of risk which renders quantitative risk-based regulatory approaches unfeasible. Even though we are fully supportive of quantitative risk management systems which capture the relevant risk factors if applied for information purposes, the flaws of their application for management and regulatory purposes are being explored in the aftermath of the Global Financial Crisis. The clarion call for 'better risk management' that resounds in the aftermath of each crisis tends to overlook one important point: Risk management is not risk avoidance.

This research found evidence of pension regulatory goals ill-aligned with pension policy. In this thesis we did not engage in the process shaping pension fund regulation although we are aware of the complex political decision-making process behind the formulation of pension laws which are then passed to regulating authorities for

interpretation. It is certainly unfair to blame pension fund regulators when the responsibility rests in the political sphere. Nevertheless, in our view a re-conceptualisation of pension fund regulation is needed which has to be aligned to the future shape of the broader pension system. The answers will differ considerably: A mature DB pension fund system preparing for the 'endgame' will need a different regulatory approach than a young 'New European Pension Funds' which is 'doomed to grow'. The risk-return profile of both the traditional and new pension funds need to be defined in a coherent regulatory framework and an open debate is needed on the societal implications of this decision. High safety standards inevitable increase the cost of pension provision which is intuitively counteractive to the requirements of the ageing population. But the implications of higher investment risk taking need support and acceptance from the stakeholders.

The revision of the EU pension fund directive might prove the shaping regulatory event on the road to this re-design of pension risk with powerful ramifications for the future EU pension landscape. The question of the imposition of the Solvency II principles on pension funds might sound a rather boring technicality. But the potential ramifications go deeper as it touches on the basic principle of pension provision in the dichotomy between risk and return. Life insurances can be epitomised as providing high safety at low returns whereas a pension fund aims at achieving high risk-adjusted investment returns. By taking investment risk a pension fund is a cost-efficient mechanism for producing pension benefits for the ageing societies. But as the employer has increasingly exited his traditional role of bearing pension risk and experience showed that the employee is not equipped to do so, the question remains who should take the position of re-insuring investment-risk taking of pension funds. Solvency II would solve this

dilemma by turning EU workplace-related pension provision from an investment-based pension provision into an insured pension provision. The question remains if we can afford this. The search should continue for better risk management. We see a re-design of pension risk sharing as a necessary ingredient for shaping the pension fund system of the 21st century.

6.5. Directions for future research

This thesis investigates pension investment risk taking and its implications. Given the upheaval in the pension fund sector and the transformative changes facing the pension systems in the ageing societies this research is a snapshot in time rather than the end of academic inquiry thereby providing avenues for future research.

While this thesis represents the summarised results from a journey through the pension landscape at turbulent times the inevitable end of a doctorate necessitates concluding the research at a certain point in time. Thus it was unfortunately not possible to rerun the expert interviews after the Global Financial Crisis. Future research into the risk attitude of the decision-makers at pension funds would benefit by this exercise as deeper insights into the time consistency and the nature or risk and risk perception could be gained.

My thesis confined on researching the process of investment risk taking at employer-sponsored DB pension funds in four OECD countries from both a qualitative and quantitative perspective. We gained important insights in the comparative analysis of pension systems, the cross-country analysis inevitably necessitates simplifications limiting the depth of our academic research. Regulation of DB pension funds still matters as these financial giants will be around for a long time to come. But we recognise that the

observed change from DB to DC will also refocus the regulatory spotlight on DC pension funds. While there is a growing body of academic research into the decision-making of employees under DC pension arrangements the decision-making at the firm level is under researched up to now. Clark and Urwin conducted research into the governance structures of DC pension funds and explored into the investment function. Extending this work into the investment-decision process in a comparative cross-country analysis and comparing the insights against what we learnt from our research on DB pension funds could provide important insights for pension fund regulation.

While we investigated in some detail the regulatory rules and norms relevant to the investment decision of pension funds we did not engage in the process of how pension fund regulation is shaped. A deeper understanding could be gained by exploring the complex interplay of various agents situated in politics and economics in formulating the regulatory agenda and response. Following Clark and Hancher and Moran the specific regulatory space surrounding pension funds could be analysed and researched in a cross-country approach thereby gaining deeper insights into why one country formulates the solution in this specific way and why this differs from the answers given somewhere else. Applying Majone's extensive academic work on regulation in the European Union might add further valuable insights into the process of pension fund regulation and further help to answer the question of convergence versus divergence of pension systems and pension regulatory systems.

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Appendix I: Questionnaire

QUESTIONNAIRE

1) How is the pension business organised at your company?

2) How would you characterise the governance structure at your pension fund?

3) Which are your primary investment goals and what are the main drivers behind these goals?

4) What are your prevailing investment strategies?

5) Which risk management tools do you apply?

6) Do you use ALM studies for managing assets and liabilities and, if so, how do you perform the ALM study?

7) How would you assess the impact of regulation and accounting rules on your pension funds / on pension funds in your country?

8) How would you characterise the regulation of pension funds in your country?

Appendix II: Pension Fund Regulation and Risk Management: Results from an ALM Optimisation Exercise

ISBN-9789264028104
Protecting Pensions: Policy Analysis and Examples from OECD Countries
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Chapter 4

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ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT