A utility-based comparison of pension funds and life insurance companies under regulatory constraints

Dirk Broeders\textsuperscript{a,1}, An Chen\textsuperscript{b,*}, Birgit Koos\textsuperscript{b,2}

\textsuperscript{a} De Nederlandsche Bank (DNB), Supervisory Policy Division, Strategy Department, PO Box 98, 1000 AB Amsterdam, The Netherlands
\textsuperscript{b} Department of Economics, University of Bonn, Adenauerallee 24-42, 53113 Bonn, Germany

\begin{abstract}
This paper compares two different types of annuity providers, i.e. defined benefit pension funds and life insurance companies. One of the key differences is that the residual risk in pension funds is collectively borne by the beneficiaries and the sponsor’s shareholders while in the case of life insurers it is borne by the external shareholders. First, this paper employs a contingent claim approach to evaluate the risk return tradeoff for annuitants. For that, we take into account the differences in contract specifications and in regulatory regimes. Second, a welfare analysis is conducted to examine whether a consumer with power utility experiences utility gains if she chooses a defined benefit plan or a life annuity contract over a defined contribution plan. We demonstrate that regulation can be designed to support a level playing field amongst different financial institutions.
\end{abstract}

\section{1. Introduction}

Defined benefit pension funds and life insurance companies are both key annuity providers. Besides governments, they are important institutions in the world for arranging old age income provisions efficiently. Table 1, based on OECD data, shows the importance of pension funds and life insurers by the size of assets under management for North America, Continental Europe and the UK. In North America pension funds dominate life insurance companies, while in Continental Europe and in the UK life insurers appear to be more important.

Although they offer similar products, there are also distinct institutional differences between pension funds and life insurance companies, as illustrated in Table 2. Pension funds usually take the form of non-profit organizations or trusts. A defined benefit pension provides a life-long income after retirement based upon the years of service, salary and a certain accrual rate; see Bodie (1990). In a final earnings defined benefit scheme, pension accrual is automatically indexed to the individual’s salary. This formula provides preretirement inflation protection to the participant but can represent a higher cost to the employer. Therefore, these days career-average schemes are also common. In a career-average scheme pension accrual might be indexed to inflation or wages; see Bikker and Vlaar (2007). However, this indexation is often contingent on the funding ratio\textsuperscript{3} of the pension fund; see Broeders and Chen (2010). In this paper we concentrate on conditionally indexed defined benefit schemes. Over their careers, part of the employees’ labor compensation is contributed to a pension fund that manages the assets and the liabilities. Often the pension is legally independent of the corporate sponsor. The available surplus (the difference between the pension fund’s assets and liabilities) can be regarded as the pension fund’s equity. It acts as a risk buffer. The residual risk\textsuperscript{4} is partly borne by the beneficiaries themselves through the conditional indexation feature and the fact that accrued benefits might be reduced if the pension fund is severely underfunded. In a continuum of overlapping generations also future participants participate in risk sharing; see e.g. Gollier (2008). New entrants to a pension fund might be confronted with losses (or gains) that accrued in the previous period. Often the

\begin{table}[h]
\centering
\begin{tabular}{|c|c|}
\hline
\textbf{JEL classification:} & \textbf{G11 G23} \\
\hline
\textbf{Keywords:} & Pension plans Annuities Barrier options Contingent claim approach Certainty equivalents \\
\hline
\end{tabular}
\end{table}
Some countries, like:

<table>
<thead>
<tr>
<th>Region</th>
<th>Pension funds</th>
<th>Life insurers</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>North America</td>
<td>10,400</td>
<td>3,972</td>
<td>14,372</td>
</tr>
<tr>
<td>Continental Europe</td>
<td>2,169</td>
<td>4,301</td>
<td>6,470</td>
</tr>
<tr>
<td>UK</td>
<td>1,831</td>
<td>2,562</td>
<td>4,393</td>
</tr>
<tr>
<td>Total</td>
<td>14,400</td>
<td>10,835</td>
<td></td>
</tr>
</tbody>
</table>

For-profit life insurance companies, usually in the form of incorporations (Inc), also provide annuities. A life annuity is a financial contract in the form of an insurance product according to which a life insurance company makes a series of payments in the future to the buyer in exchange for an immediate lump sum payment. The payment stream continues until the date of death of the annuitant. The annuity might be increased with annual bonuses if the underlying investments deliver sufficient returns, a feature called “with profit”; see e.g. Bodie and Merton (1993). The pension fund’s board typically consists of representatives of both employers and employees. The board decides on asset allocation, contribution rate and indexation policy. Beneficiaries can have some influence on this through the election of board members.

Pension regulation nonetheless is less strict. The confidence level of 97.5%, e.g. for Dutch pension funds, is significantly lower than the 99.5% confidence level in “Solvency II”. In addition, some countries allow substantial recovery periods for pension funds to restore sufficient funding; see Broeders and Chen (2010). Insurance supervision on the other hand is stricter. If the solvency ratio (the available over the required solvency level) is inadequate the supervisory authorities will react promptly and the life insurance company will be liquidated if there is no resurrection in the short run. This way, consumers are relatively certain that they do not lose significant value at liquidation. The differences in regulation may be justified by the additional policy instruments that pension funds possess, such as their ability to raise future contributions and cut back on indexation of pensions when necessary. As a rule of thumb, this greater flexibility should therefore reflect more or less the difference in confidence levels and recovery periods.

There are already several papers that discuss the similarities and differences between pension funds and life insurance companies. Blake (1999), for example, draws parallels to the long-term nature of liabilities and investment objectives. The not-for-profit pension funds do not attract funding in a competitive market, but seek to meet pension obligations at minimum cost to the scheme’s sponsor. Typically, life insurance companies need to raise funding in a competitive market and as such have additional costs in the form of marketing expenditures. They are in the so-called “spread business” as they try to earn a spread on the return on assets and funding costs and on the underwriting of insurance risks.

Davis (2002) describes distinct differences in the risks that both institutions face, reflected in their investment strategies. Liabilities of pension funds are typically more uncertain than those of life insurance companies. Defined benefit pension liabilities are related to wage growth during the accumulation phase and often linked to inflation after retirement. These differences reflect in a more profound investment strategy. Pension funds favor real investment opportunities that keep track with the development of liabilities. Often, stocks and real estate are considered the best investment choice for that. Life insurance companies often prefer bonds as the early surrender option can reduce the duration of liabilities significantly. Next to diverging investment policies, Davis (2002) also argues there are enough reasons for different regulatory regimes. Having a greater need for real investment returns, pension funds require more flexibility on the asset side, while life insurance companies, operating in a competitive market, should be supervised more strictly.

5 An insurance company can also take the form of a mutual. This is fairly comparable to a pension fund.

6 For the purposes of calculating the minimum amount of the additional assets, the European Pension Directive (2003/41/EC) refers to Articles 27 and 28 of the Life Insurance Directive (2002/83/EC). The minimum amount is 4% of the technical provisions plus 0.3% of the capital at risk.

7 Several papers challenge this conventional wisdom. Exley et al. (1997), Bader and Gold (2003) and Gold and Hudson (2003) all apply the no-arbitrage principle and the law of one price to show that the higher expected return on stocks reflects their greater risk in such a way that the risk-adjusted expected return on stocks is equal to the return on risk-free bonds. Bodie (1995) demonstrates that insurance against an overall return below the risk-free interest rate may be acquired by a “forward-strike” put option. The crucial insight is that the value of the put option is shown to increase with time to maturity and volatility.

8 Early surrender is the right the policy holder has to cancel the contract prematurely.
دریافت فوری
متن کامل مقاله

امکان دانلود نسخه تمام متن مقالات انگلیسی
امکان دانلود نسخه ترجمه شده مقالات
پذیرش سفارش ترجمه تخصصی
امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
امکان دانلود رایگان ۲ صفحه اول هر مقاله
امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
دانلود فوری مقاله پس از پرداخت آنلاین
پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات