Original Article

Myth busting: Defined contribution Clearing up common misperceptions about defined contribution pension schemes

Received (in revised form): 10th February 2012

Oskar Poiesz

is a Manager Pension Providers at the Investment Solutions & Research department of Robeco. Earlier, he worked as a Consultant for KPMG, Simcorp and Getronics. He obtained his MSc in Engineering at Twente University in the Netherlands.

Laurens Swinkels

is an Assistant Professor of Finance at the Erasmus School of Economics in Rotterdam, the Netherlands, and a Portfolio Analyst at the Investment Solutions & Research department of Robeco. He is also a board member at the Robeco Employees Pension Fund. He obtained his PhD in Finance and MSc in Econometrics from Tilburg University in the Netherlands.

ABSTRACT Many factors play a part when comparing different pension schemes. Myths and misperceptions cloud the discussion whether employers or employees are better off with a defined benefit (DB), defined contribution (DC) or a hybrid scheme. We notice that, especially among proponents of DB schemes, some persistent misconceptions about DC schemes persist. In this article, we aim to clear up five of these myths: (i) DC schemes generate lower pensions than DB schemes, (ii) Individuals in DC schemes take poor investment decisions, (iii) Management fees in DC schemes are too high, (iv) Collectivity is lost in DC schemes, (v) Participants in DC schemes run big interest rate risks. DC pension schemes might not be a panacea to all retirement problems, but we feel a fair comparison with DB pension schemes is required.

Pensions (2012) 17, 260–269. doi:10.1057/pm.2012.30

Keywords: behavioral finance; defined benefit; defined contribution; pension investing; pension scheme design

INTRODUCTION

Countries with a culture of defined benefit (DB) pension schemes have experienced pressure to switch to defined contribution (DC) pension schemes. This pressure can be attributed to adverse financial markets, such as below average equity returns and decreasing interest rates, and increased longevity of participants. Also, the

increasing size of pension schemes relative to the employers sponsoring the pension schemes shows that pension costs can have a major impact. Countries in which freedom of choice and individualism are more important, such as the United States and the United Kingdom, have seen a massive closure of DB schemes that are often replaced by individual DC schemes. The main advantage for the employer is that pension costs are more predictable and easier to control as part of the compensation package. This is recognized by International Financial Reporting Standards (IFRS), which only require

Correspondence: Oskar Poiesz
Robeco Investments, Coolsingel 120, Rotterdam, The Netherlands
E-mail: o.poiesz@robeco.nl

the pension contributions to be reported as expenses. DB schemes also have to take into account the balance sheet position of the pension fund and changes therein. Swinkels (2011) shows that several Dutch companies have explicitly mentioned IFRS as a reason to move from DB schemes to collective or individual DC schemes.¹

In the Netherlands, the discussion on increased risk sharing of employers with employees has started. This can, for example, be seen by the massive shift from final-pay schemes to average-pay schemes, in which inflation adjustment depends on the solvency level of the pension fund. In 1998, about 1.2 million employees (25 per cent of the workforce) had an average-pay scheme and in 2011 this was 5.3 million employees (91 per cent of the workforce).² For an overview of pension risk sharing in the Netherlands, see Ponds and Van Riel (2009).³ In May 2012, the Minister of Social Affairs even put forward a proposal for a new pension contract in which the pension contribution is stabilized, essentially transforming DB schemes into collective DC schemes.

In addition, a new pension institution was formed in 2011, the Premium Pension Institute (PPI), which can operate in a pan-European context. This new pension institution is made possible by the Institution for Occupational Retirement Provision Directive and is typically suitable for the accrual phase of DC pension schemes. During its short existence, the PPI has become a popular pension institution, with eight licenses being granted by the regulator and two more announced.

A large shift from DB to individual DC has not (yet) happened in the Netherlands. In 1998, less than 1 per cent of pension fund participants had an individual DC scheme, whereas in 2011 this was close to 5 per cent. The shift in the United States has been much larger. In 2009, about 43 per cent of the employees had at least one DC scheme.⁴ In the United Kingdom, about 8.2 million employees were member of a DB plan, but only 1.6 million were active members in 2011. The number of active participants in DC schemes is estimated to be 3.6 million in 2011.⁵ According to Ponds and

Van Riel (2009), the most important reasons for the difference between the Netherlands, on the one hand, and the United States and United Kingdom, on the other, are the difference in pension fund governance and political and social preferences. In the Netherlands, the power of unions is larger in the pension domain and collectivity and solidarity are generally considered an important aspect of pension provision.

In the Netherlands, individual DC pension schemes are often seen as undesirable. Some of the arguments put forward by proponents of DB schemes are based on misconceptions about DC schemes. In this article, we describe some of these common misperceptions and indicate what DC pension providers have done over the past years to improve DC pension schemes. This is important information for employers and employees who decide about the type of pension schemes they consider most attractive.^{6,7} The remainder of this article is organized around these common misperceptions that we label as *myths*. The sole aim of our article is to bust these myths, and not to paint an exhaustive list of pros and cons of DC and DB schemes. For such analysis, we refer to Ezra, Collie and Smith (2009) and Laros and Lundbergh (2012).^{8,9} Also, OECD (2012) contains many considerations for optimal pension plan design.¹⁰

MYTH: DC SCHEMES GENERATE LOWER PENSIONS THAN DB SCHEMES

The two most important determinants of the outcome of a pension scheme are the contributions that are paid into the scheme and the investment returns that are made on these contributions.

Pension contributions

In the United States and United Kingdom, participation in pension schemes is typically voluntary. It is known that when employees are allowed to choose between income now and pension saving for later, they tend to prefer the income now. See, for example, Frederick, Loewenstein and O'Donoghue (2002) for extensive research on inter-temporal choice.¹¹

When participants choose not to contribute part of their salary to their DC pension scheme, it is not surprising that their pension result equals zero. In DB schemes, employees are usually automatically covered by the pension scheme and hence contributions are made. It is therefore essential that employees with a DC pension scheme also contribute to the scheme to increase the pension outcome. In countries where DC pension schemes are optional, there also seems to be an effect of education on the level of participation. Participation of employees without high school diploma earning US\$50 000 or more is close to 50 per cent, whereas for employees with a university degree this is more than 75 per cent.¹²

In the United Kingdom, auto-enrolment in pension schemes has recently been made compulsory, starting in 2012 for large companies.¹³ It has been shown that when employees are automatically enrolled into their pension scheme, participation increases significantly; see Soto and Butrica (2009) for US evidence.¹⁴ According to the OECD (2012), when auto-enrolment was introduced in New Zealand in 2007, this led to opt-out rates as low as 20 per cent. This solution suggests that the low participation level is a thing of the past and will most likely not continue in the future, leading to more similar pension outcomes of DC and DB schemes.

Even when employees decide to participate, it is the contribution level they choose that is important for the pension outcome. The average pension premium of DC plans in the United States is 7.5 per cent of salary.¹⁵ The average pension premium in the Netherlands is double with 15 per cent in 2010.¹⁶ In the United States, several initiatives have been launched to increase the contribution level of participants in DC schemes. An example is that participants are requested to sign a contract *today* to increase

their pension contribution when they get a salary increase *tomorrow*; see Bernartzi and Thaler (2004).¹⁷

In the Netherlands, there is one important practicality concerning the tax treatment of contributions to DB and DC schemes. In principle, all pension contributions to DB schemes are tax-exempt. In the current low interest rate environment, this has led to contribution levels of up to 30 per cent of salary for some firms, regardless of participant age. For DC schemes, the maximum tax-exempt amount has been set by the tax office and takes the actuarial fair value of a DB pension promise calculated at a 4 per cent interest rate for each age group. This leads to contribution rates of about 5 per cent for younger employees and over 30 per cent for older employees. Although this different tax treatment is subject of discussion, currently the higher tax deductibility gives DB schemes a tax advantage in the Dutch institutional setting.

So, in short, an important factor for the lower pension outcome of DC schemes in some parts of the world can be attributed to low participation and low contribution levels. This is not an automatic feature of DC schemes, but an organizational shortcoming that has been solved by most sophisticated providers of DC pensions.

Investment returns

The second important feature is the investment return generated on the contributions. In Table 1, we show the annual investment returns since 2000. Most pension professionals would assume that equities generate an excess return above cash of somewhere between 2 per cent and 6 per cent. The realized returns for most participants in DC schemes have been lower, leading to disappointment among participants. Although their disappointment is understandable,

Table 1: Annual investment returns (in per cent) on global equities and Euro-bonds

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Average
Equity	-31.7	11.3	6.9	26.8	7.9	-1.2	-37.2	26.7	20.1	-1.8	2.8
Bonds	9.9	4.0	7.7	5.3	-0.3	1.8	9.4	4.3	1.2	1.8	4.5

Source: Robeco, Datastream.

it cannot be attributed to the DC nature of their pension scheme. Most pension funds in the Netherlands have seen their solvency levels decrease substantially over the past 10 years due to poor investment returns as well. This has led to several years without annual inflation compensation, and might even lead to cuts in benefits in the near future.¹⁸ Also, DB pension funds in the United States and United Kingdom are heavily underfunded due to poor investment returns. These levels of underfunding are perhaps less visible to participants, but nevertheless they are problematic and may have consequences. Hence, prolonged periods of poor investment returns lead to poor pension outcomes, but this is not different for DB and DC schemes. The relative advantage of DC schemes is that the pension situation is more transparent, and individuals can decide to save more in the third pillar if their pension outcome is too low, and pensions are more portable across countries. This is much more difficult in a less transparent DB scheme with funding shortages that might or might not be shared with participants in the near future because companies are not able to cover them.

In the OECD (2012), the low investment returns are correctly seen as a threat to all funded pension systems, and not only as a problem for DC schemes: *Even when measured over the period 2001–2010, the pension funds' real rate of return in the 21 OECD countries that report such data averaged a paltry 0.1 per cent yearly. Such disappointing performance puts at risk the ability of both DB and DC arrangements to deliver adequate pensions.*

In Table 1, we show the investment returns on a global equity investment and a bond investment in the eurozone. The global equity investment is represented by the MSCI World Index (€) and the bond investment by the JP Morgan EMU Government Bond Index (€). Both series are on a total return basis, thus including the dividend and coupons on these investments. These numbers demonstrate that over the past decade, average returns have been low, and returns on risky equity investments have been even lower than on government bonds.

MYTH: INDIVIDUALS IN DC SCHEMES TAKE POOR INVESTMENT DECISIONS

There are many anecdotes about poor investment decisions by individuals in DC pension schemes. We describe here the two most common investment mistakes and the solution that pension providers currently are able to offer to ensure that the number of participants making these mistakes is at most small.

Investments in one's own company equity

Several employers have motivated their employees to invest the pension contributions fully in the equity shares of their own company. For example, Rauh (2006) shows that employees who own equity of their company help protect against hostile takeovers that might hurt the management of the companies.¹⁹

However, investment in one's own company stock leads to a severely under-diversified pension investment portfolio. This does not harm the participant as long as his or her own company is performing well. Still, it leads to disastrous investment performance when the company goes into distress. For example, when Enron defaulted, employees who had invested the pension contributions mainly in their own company equity lost their jobs and their pension savings as well. Although we have seen a reduction in the number of Americans with a DC account with more than 10 per cent invested in their own company stock, they still accounted for 35 per cent in 2008. Even though the dangers of being under-diversified should be clear by now, currently 7 per cent of employees still have more than 80 per cent of their pension invested in their own company equity.²⁰ From all recent hires in the United States in 1998, over 60 per cent invested in their own company stock. This number has dropped to 35 per cent in 2009. Although a remarkable drop in a decade, in absolute terms it is still a large number.²¹

In the Netherlands, such under-diversification is almost impossible due to the law. Article 135.1(b) of the Pension Law states that at most 5 per cent of the portfolio can be invested in the assets of the sponsoring company. By the same

Pension Law, pension providers in the Netherlands need to adhere to the prudent person principle in the default investment schemes. Moreover, for participants who opt out of the default, the pension provider has the duty of care to inform the participant about the investment policy chosen. Such regulation makes it virtually impossible for participants to be severely under-diversified, especially with regards to equity investments in their own company.

Financial literacy

It is often heard that many individuals have not received enough education on financial matters to make sound decisions for their retirement. This is a global phenomenon, as indicated by the results on relatively simple financial questions; see Lusardi and Mitchell (2011).²² When individuals are asked about their financial knowledge, the majority feels incompetent to make decisions; see Van Rooij, Kool and Prast (2007).²³ Many individuals seem to have difficulty determining their risk attitude. This might, for example, lead to young participants investing only in cash and people close to retirement only in equities.

Financial education might be helpful to increase the knowledge of participants. See, for example, the Financial Security Project at Boston College (see <http://fsp.bc.edu/>). Nevertheless, a well-designed investment scheme by professionals has many advantages over financial education. Over the past decade, pension providers have cooperated with investment management firms to develop life cycle investment schemes. Participants are designated to default life cycle schemes unless they opt out and determine an investment profile that they think better matches their personal situation. In the United States, the use of life cycle or target date funds has increased rapidly over the past years. Whereas in 2006 close to 30 per cent of recent hires younger than 50 years old chose these life cycle schemes, in 2010 this number was close to 50 per cent.²⁴

These life cycle strategies have in common that they invest more in risky assets for participants with a longer investment horizon. This holds for the new contributions to the individual retirement account, but also for the accumulated

capital in the account. In the Netherlands, it is common that all participants have a default life cycle investment strategy that has been developed by investment professionals (retirement consultants, pension funds, asset managers and so on). Until recently, it was not so common for DC schemes in the United States and the United Kingdom to have a default investment strategy. Participants had to take action themselves to change their investment portfolio when their investment horizon shortened. Bernartzi and Thaler (2007) document the positive experiences with defaults for contributions and investments.²⁵ Viceira (2008) provides a very interesting survey on the theory behind life cycle investing for DC pension schemes and the advances and challenges for the pension industry to improve these defaults even further.²⁶

In Table 2, we show returns and risks over the 10-year period from 2002 to 2011 of an example life cycle profile as we have run for DC schemes at Robeco. In this life cycle scheme, young participants have a large allocation to return-generating assets, whereas older participants invest more in low-risk assets like bonds. Note that this example life cycle profile does not contain any benefits from tactical asset allocation, nor does it incorporate any form of guarantees. Both characteristics are advocated by, for example, Alles (2011) as potentially adding value for certain groups of participants.^{27–29}

In Table 2, we see that the investment risk, measured by volatility, of life cycles decreases for cohorts closer to retirement. This also holds for downside risk estimates over the period from 2002 to 2011. For example, for a 30 year old, the investment profile implies 12.3 per cent volatility, while this is only 2.8 per cent for a 61 year old. Smith (2011) emphasizes that the choice of investment volatility that a participant experiences during the accumulation phase is a very important task for pension providers and the employers that offer the plan.³⁰

In the worst years, the return for a 30 year old is below –33.4 per cent, whereas for a 61 year old this is –5.4 per cent. This clearly shows the advantage of the financial capital being invested with less risk as investors get closer to retirement.

Table 2: Average returns (in per cent) over the period 2002–2011 for different age cohorts of an example DC scheme

	< 25 years	25–34 years	35–44 years	45–49 years	50–54 years	55–56 years	57–58 years	59–60 years	61–62 years	63–64 years
Average return (percentage per annum)	4.0	4.2	4.7	4.6	4.4	4.1	3.5	3.2	3.0	3.2
Volatility (percentage per annum)	13.1	12.3	10.8	9.1	7.4	5.4	4.3	3.2	2.8	2.3
Lower bound (2.5 per cent)	–34.8	–33.4	–30.5	–26.5	–22.4	–16.2	–12.3	–7.3	–5.4	–3.0
Upper bounds (97.5 per cent)	35.0	33.4	30.1	25.3	20.5	16.5	13.4	10.4	10.0	8.0

Source: Robeco.

Table 3: Annual returns (in per cent) for different age cohorts of an example DC scheme

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Average
<25 years	–16.4	12.9	11.2	29.2	13.7	5.0	–37.7	34.2	15.7	–6.0	3.9
25–34 years	–14.5	13.0	11.1	28.1	13.3	5.2	–36.0	32.6	15.1	–5.4	4.2
35–44 years	–10.7	12.9	10.9	25.9	12.4	5.6	–32.5	29.4	13.7	–4.3	4.7
45–49 years	–7.7	11.3	10.2	22.2	11.0	4.6	–28.1	24.1	12.3	–2.7	4.6
50–54 years	–4.7	9.7	9.5	18.6	9.6	3.6	–23.5	19.0	10.8	–1.0	4.4
55–56 years	–2.7	7.7	7.9	15.8	7.0	4.2	–16.1	12.3	8.2	0.6	4.1
57–58 years	–1.5	5.2	6.2	12.2	4.4	2.9	–11.7	9.3	7.8	2.0	3.5
59–60 years	–0.1	4.2	5.6	10.0	3.2	2.4	–5.8	4.6	5.7	3.0	3.2
61–62 years	0.3	3.5	4.5	8.3	2.0	2.3	–3.9	5.0	5.6	3.1	3.0
63–64 years	2.5	3.6	4.4	6.8	1.8	2.5	–1.1	3.5	4.5	3.4	3.2

Source: Robeco.

We see that, in line with Table 1, the investment returns over the past 10 years have been relatively low for all participants. The return for somebody in the third cohort was highest with 4.7 per cent per annum, whereas it was lowest on average for a 61 year old with 3.0 per cent.³¹

In Table 3, we see the returns per calendar year for each age cohort. It is clear that the younger participants have been exposed to the volatile financial markets with the large negative returns in 2002 and 2008 of –16.2 per cent and –37.7 per cent, respectively. The older generations have experienced much less volatility. For those close to retirement, 2008 was the only negative year with a –1.1 per cent return. Thus, by introducing a life cycle investment scheme participants are not, as is sometimes claimed, exposed to huge investment risks just before retirement.

MYTH: MANAGEMENT FEES IN DC SCHEMES ARE TOO HIGH

Ezra, Collie and Smith (2009) describe that DC schemes used to be small in size and hence the cost load was relatively high. Many of the initial

schemes were not standardized and had a small scale, either a limited number of participants or a small amount of contributions per participant, or both. In such case, it is difficult to capture economies of scale. Bikker and De Dreu (2009) analyze the relationship between costs and size of a pension fund.³² They find that large pension funds have lower costs than small pension funds.

Retail mutual funds were the most suitable investment pools to achieve at least some level of scale for the small DC pension schemes. In some countries, the investment fees (typically between 1 and 2 per cent of assets) on these mutual funds were also used to pay (part of) plan administration fees or investment advice for the participant. As the asset base in DC schemes has increased, modern versions of DC schemes make use of institutional investment funds, with, in general, substantially lower cost loadings. This implies that DC plan administration and investment advice is not included in the fee anymore. This now has to be organized separately, possibly with another specialized provider. This improves transparency, as it will be clearer how much added value is delivered by

each of the products or services that make up a well-designed pension plan.

It is important to note that for asset management organizations it is not relevant who bears the investment risk (employer in a DB scheme, or employee in a DC scheme), but what the size is of the client that he has to service with an asset management product. Hence, scale and complexity of the product determine the investment costs, and not the bearer of the investment risk. This does not mean that asset managers cannot have an opinion on the pension scheme design. On the contrary, some asset managers are in the position to also advice on the pension contract design and associated risk profiles. Nevertheless, there is no reason why the price of the asset management mandates should depend on the bearer of the risk.

How do the investment costs of DC schemes compare with those of large pension funds? The Dutch civil servant industry pension fund reported in their annual report over 2011 investment costs of 0.64 per cent over total assets worth EUR 246 billion. The Dutch health care industry pension fund PFZW reported 0.55 per cent investment costs over total assets to the amount of EUR 110 billion in their 2011 annual report. It seems that the investment costs of life cycle solutions offered by most PPI are comparable or even lower than the costs reported by the largest DB pension funds. Consultant IG&H reports in 2012 that on average PPIs charge between 0.4 per cent and 0.5 per cent investment costs on life cycle solutions. And the Lane, Clark and Peacock's annual report 2011 on fees in DC schemes shows a significant lower fee structure for PPIs than its insurance competitors.

MYTH: COLLECTIVITY IS LOST IN DC SCHEMES

It is sometimes claimed that by introducing DC schemes collectivity is lost. This need not be the case. Examples of collectives that are formed outside traditional organizations are, for example, United Consumers or other associations that create scale and can therefore benefit from economies of scale. This requires

relatively standardized products in the pension domain. Default life cycle strategies seem to be a likely candidate to be able to capture the benefits of collective investments by individuals. Many DC plans have an opt-out possibility for individuals who have different characteristics than implied by the default life cycle strategy. These individuals may choose a tailor-made investment strategy, probably at a higher cost as economies of scale are less likely to be attainable. When financial literacy of a group of employees is low, one could even wonder whether an opt out creates or destroys value at plan level. Bernartzi en Thaler (2002) find that investor autonomy, in the aggregate, does not seem to be valuable, as not many individuals prefer their own choice to the median choice made by their peers.³³

Several risk-sharing features of insurance products that are linked to pensions, such as disability pensions or survivor pensions, are also desirable features in a DC pension plan. Hence, pension providers in the Netherlands have started offering these insurance products to their participants using the collectivity of the group of participants when prices have to be negotiated with insurance companies. Thus, also in this case it seems possible to use collectivity and risk-sharing mechanisms to improve DC pension products.

One specific type of risk sharing, intergenerational risk sharing, does not seem to work well within individual DC schemes. According to Laros and Lundbergh (2012), this type of solidarity is not possible without compulsory participation and not desirable in pension schemes when the pension contract is not complete. Others, for example Bovenberg, Koijen, Nijman and Teulings, (2007) and Cui, De Jong and Ponds (2011) show that there are benefits from intergenerational risk sharing that cannot be achieved by individuals in a DC scheme.^{34,35} Thus, proponents of DB schemes do seem to have a justified worry that these intergenerational risk-sharing advantages are lost to a large extent. These intergenerational risk-sharing arrangements do seem to come at a cost: some generations might be tempted to benefit at the expense of other generations.

In the current discussion on a new pension agreement in the Netherlands, wealth transfers from one generation to the other are heavily debated. A well-designed governance system is required to make this work in practice. A question for further research is whether the costs of intergenerational risk sharing are outweighed by its benefits.

MYTH: PARTICIPANTS IN DC SCHEMES RUN BIG INTEREST RATE RISKS

It is not only the accumulation phase of the DC pension plan that is different in many countries, the way the capital is used once the participant is retiring is also vastly different. Maurer and Somova (2009) give an excellent overview of the different regulations with regards to the de-cumulation phase of DC pension plans.³⁶ In the Netherlands, for example, it is compulsory to convert the entire capital into an annuity at retirement date. Whether this regulation is in the best interest of participants is questioned by Brown and Nijman (2009).³⁷ In other countries, only part of the capital has to be converted, or for some countries there is no compulsory annuitization, potentially leaving all longevity risk with individuals. But even in these countries, retirees may want to purchase annuities from the capital they saved during their working life. We do not take into account the potential problems that individuals experience when purchasing an annuity. For an overview on challenges from the demand

and supply side in the annuity market, see Harrison (2012).³⁸

Annuities are priced by insurance companies using close to default-free market interest rates. This means that when interest rates decrease the price of receiving a fixed amount increases substantially. With current mortality rates, it is estimated that the price of an annuity increases by about 10 per cent when the interest rate decreases by 1 per cent. Over the past decade, interest rates have decreased substantially around the globe, increasing the price of annuities. Some consider this interest rate risk an important disadvantage of DC pension schemes.

However, DC pension providers in countries where purchasing annuities is compulsory have recognized this disadvantage and may incorporate interest rate hedging strategies in their default life cycle schemes. This means that life cycle schemes do not switch to cash investments when the retirement date approaches, but to a long-term bond portfolio with an interest rate sensitivity corresponding to that of an annuity. This has resulted in large capital gains over recent years. However, these capital gains are not real gains, but required to ensure the value of the annuity payment. When interest rates increase in the future, the retirement capital will be lower to account for the cheaper annuity price.

The top panel in Table 4 is the same as Table 2. The bottom panel of Table 4 shows the investment performance of the life cycle scheme with interest rate hedging. For the first three age cohorts, below 45 years, there is no

Table 4: Average annualized returns (per cent) over the period 2002–2011 for different age cohorts of an example DC scheme

	< 25 years	25–34 years	35–44 years	45–49 years	50–54 years	55–56 years	57–58 years	59–60 years	61–62 years	63–64 years
<i>Without interest rate hedge</i>										
Average return (percentage per annum)	4.0	4.2	4.7	4.6	4.4	4.1	3.5	3.2	3.0	3.2
Volatility (percentage per annum)	13.1	12.3	10.8	9.1	7.4	5.4	4.3	3.2	2.8	2.3
Lower bound (2.5 per cent)	–34.8	–33.4	–30.5	–26.5	–22.4	–16.2	–12.3	–7.3	–5.4	–3.0
Upper bounds (97.5 per cent)	35.0	33.4	30.1	25.3	20.5	16.5	13.4	10.4	10.0	8.0
<i>With interest rate hedge</i>										
Average return (percentage per annum)	4.0	4.2	4.7	6.3	7.8	9.0	9.9	8.8	7.8	7.2
Volatility (percentage per annum)	13.1	12.3	10.8	8.6	7.4	7.7	9.5	8.7	7.6	6.6
Lower bound (2.5 per cent)	–34.8	–33.4	–30.5	–23.5	–15.0	–4.6	–4.8	–4.5	–4.1	–3.0
Upper bounds (97.5 per cent)	35.0	33.4	30.1	27.2	27.3	28.7	30.6	25.8	22.2	18.8

Source: Robeco.

interest rate hedging. Afterwards, the interest rate sensitivity is increased to mimic the interest rate sensitivity of the annuity. This leads to high risks when measured on an asset-only basis, as the volatility of the returns increases instead of decreases when participants reach 55 years (from 7.4 per cent to 7.7 per cent). This increased asset-only volatility reduces when the volatility of the annuity payment is taken into account.

As interest rates have decreased, bond returns have been high over the past 10 years. This leads to high returns of older participants in DC schemes. For example, a 57 year old earned on average 9.9 per cent per year with the interest rate hedge, while this would have been only 3.5 per cent per year without the interest rate hedge.

Although the returns earned by those with an interest rate hedge seem high, the annuity these participants needed to buy at retirement had also increased in value by the same amount. All in all, Table 3 indicates that interest rate shocks can in practice be hedged by participants in DC schemes.

SUMMARY AND CONCLUSION

In this article we presented some common misconceptions about DC pension schemes. We have shown how pension providers have been improving their DC products into institutional products that in many respects can compete with DB pension schemes in terms of attractiveness.

Myth 1: DC schemes generate lower pensions than DB schemes.

We show that lower contribution and participation rates have caused DC pensions to have been lower than DB schemes. With similar contribution rates, the level of pensions of DC schemes is much closer to that of DB schemes.

Myth 2: Individuals in DC schemes take poor investment decisions.

We agree that most individuals are not financially literate enough to make good investment decisions for their retirement. But this should not be a problem when carefully designed default life cycle investment strategies are offered and

large investments in the equity of the employer are not offered – or not allowed to be offered.

Myth 3: Management fees in DC schemes are too high.

From the perspective of pricing an asset management mandate, asset managers have no reason to discriminate between bearers of the risk of the investments they manage. Investment fees depend on complexity and scale. As DC schemes have historically been non-standardized and small, this has led to higher investment management costs. With DC schemes receiving more assets, management fees have already decreased to institutional levels. Especially the new pan-European pension institutions in the Netherlands, the PPI, offer cost-effective life cycle investment products that can compete with the largest DB schemes.

Myth 4: Collectivity is lost in DC schemes.

Collectivity to negotiate investment management fees, as well as risk-sharing features such as disability pension or survivor pension are used in modern DC schemes. However, intergenerational risk sharing is lost. It is currently a hot topic of debate what the value of this type of risk sharing mechanism is and how this should be organized to remain effective in the future.

Myth 5: Participants in DC schemes run big interest rate risks.

In countries where participants are obliged or willing to buy annuities, participants have to take into account the price of these annuities when they retire. Pension providers have successfully offered interest rate hedging investments in their default life cycle strategies to reduce this risk.

In order to compare whether employers or employees are better off with a DB, DC or a combination (hybrid) scheme, many factors play a role, possibly also factors that we did not discuss in this article. Our purpose was to try to bust some persistent myths around DC pension schemes. DC pension schemes might not be a panacea to all retirement problems, but

the picture that some proponents of DB schemes paint is based on anecdotes from the past.

ACKNOWLEDGEMENTS

We would like to thank Sef Laschek, Ruben Laros, Stefan Lundbergh, Roderick Molenaar and Folkert Pama for valuable comments. The views in this article are not necessarily shared by Robeco or any of its subsidiaries.

REFERENCES

- Swinkels, L. (2011) Have pension plans changed after the introduction of IFRS? *Pensions* 16(4): 244–255.
- See statistics from DNB, <http://www.statistics.dnb.nl>, accessed August 2012.
- Ponds, E. and Van Riel, B. (2009) Sharing risk: The Netherlands' new approach to pensions. *Journal of Pension Economics and Finance* 8(1): 91–105.
- Employee Benefits Research Institute. (2011) Ownership of Individual Retirement Accounts (IRAs) and 401(k)-Type Plans, 1996–2009. EBRI Notes 32(10).
- The Pensions Regulator. (2011) DC trust: A presentation of scheme return data, <http://www.pensionregulator.gov.uk>, accessed August 2012, Note that, according to the OECD (2012), the occupational pension coverage in the United Kingdom is 30 per cent of the working population, whereas this is 88 per cent in the Netherlands.
- Ashcroft (2010) Worries that employers have too little incentive to choose a well-designed DC scheme provider for their employees, as the risk is anyway transferred from the employer to the participant. We think that consumer and labor associations will fill this void and eliminate non-competitive product offerings.
- Ashcroft, J. (2010) What are we doing with DC? *Pensions* 15(2): 82–88.
- Ezra, D., Collie, B. and Smith, M. (2009) *The Retirement Plan Solution: The Reinvention of Defined Contribution*. New Jersey: Wiley Finance.
- Laros, R. and Lundbergh, S. (2012) Principles for better pensions: Lessons from the Netherlands. *Pensions* 17(2): 88–93.
- OECD. (2012) *Pension Outlook 2012*. Paris, France: OECD Publishing.
- Frederick, S., Loewenstein, G. and O'Donoghue, T. (2002) Time discounting and time preference: A critical review. *Journal of Economic Literature* 40(2): 351–401.
- Employee Benefits Research Institute. (2010) Retirement Plan Participation: Effect of Education. Fast Facts #150.
- The Pensions Regulator. (2011) An introduction to workplace changes, <http://www.thepensionsregulator.gov.uk>, accessed August 2012.
- Soto, M. and Butrica, B. (2009) Will Automatic Enrolment Reduce Employer Contributions to 401(k) Plans? Center for Retirement Research Working Paper 2009–33.
- Employee Benefit Research Institute. (2009) Average Worker Contribution Rates to 401(k)-Type Plans. Fast Facts #117.
- Centraal Plan Bureau. (2012) Macro Economische Verkenning 2012, <http://www.cpb.nl>.
- Bernartzi, S. and Thaler, R. (2004) Save more tomorrow: Using behavioral economics to increase employee saving. *Journal of Political Economy* 112(1): 164–187.
- See, for example, IPE (19 July 2012). Many Dutch schemes facing cuts if recovery stalls – Pensions Federation, <http://www.ipe.com>, accessed August 2012.
- Rauh, J. (2006) Own company stock in defined contribution pension plans: A takeover defense? *Journal of Financial Economics* 81(2): 379–410.
- Employee Benefit Research Institute. (2009) Company Stock Holdings Continued to Shrink in 401(k) Accounts in 2008. Fast Facts #145.
- Employee Benefit Research Institute. (2010) 401(k) Holdings in Company Stock Continued to Shrink in 2009. Fast Facts #187.
- Lusardi, A. and Mitchell, O.S. (2011) Financial literacy around the world: An overview. *Journal of Pension Economics and Finance* 10(4): 497–508.
- Van Rooij, M.C.J., Kool, C.J.M. and Prast, H.M. (2007) Risk–return preferences in the pension domain: Are people able to choose? *Journal of Public Economics* 91(3–4): 702–722.
- Employee Benefit Research Institute. (2012) Younger 401(k) Participants Turning to Target-Date Funds. Fast Facts #221.
- Bernartzi, S. and Thaler, R. (2007) Heuristics and biases in retirement savings behavior. *Journal of Economic Perspectives* 21(3): 81–104.
- Viceira, L. (2008) Life-cycle funds. In: Lusardi (ed.) *Overcoming the Savings Slump: How to Increase the Effectiveness of Financial Education and Saving Programs*. Chicago, IL: Chicago University Press, pp. 140–178.
- Alles, L. (2011) Design considerations for retirement savings and retirement income products. *Pensions* 16(1): 4–12.
- In general, having a well-defined menu of investment choices available in a DC scheme may lead to higher returns for participants; see, for example, Koh and Mitchell (2010) for the results that Singapore's Central Provident Fund has achieved.
- Koh, B. and Mitchell, O. (2010) What's on the menu? Included versus excluded investment funds for Singapore's Central Provident Fund investors. *Pensions* 15(4): 276–286.
- Smith, G. (2011) Considering investment risk in a DC plan. *Pensions* 16(1): 33–38.
- Of course, a 61 year old will only be 2 years in the second last cohort. This represents the average for that asset mix over the past 10 years.
- Bikker, J.A. and De Dreu, J. (2009) Operating costs of pension funds: The impact of scale, governance and plan design. *Journal of Pension Economics and Finance* 8(1): 63–89.
- Bernartzi, S. and Thaler, R. (2002) How much is investor autonomy worth? *Journal of Finance* 57(4): 1593–1616.
- Bovenberg, L., Kooijen, R., Nijman, T.E. and Teulings, C. (2007) Saving and investing over the life cycle and the role of collective pension funds. *De Economist* 155(4): 347–415.
- Cui, J., De Jong, F. and Ponds, E. (2011) Intergenerational risk sharing within funded pension schemes. *Journal of Pension Economics and Finance* 10(1): 1–29.
- Maurer, R. and Somova, B. (2009) *Rethinking Retirement Income Strategies – How Can We Secure Better Outcomes for Future Retirees?* Brussels, Belgium: EFAMA.
- Brown, J. and Nijman, T.E. (2009) Opportunities for improving pension wealth decumulation in the Netherlands. In: L. Bovenberg, C. Van Ewijk and E. Westerhout (eds.) *The Future of Multi-Pillar Pensions*. Cambridge, UK: Cambridge University Press, pp. 330–371.
- Harrison, D. (2012) Is failure imminent for the United Kingdom's annuity market? *Pensions* 17(2): 71–79.