

Challenges of Pay out Phase in Defined Contribution Pension Environment

By S. P. Subhedar

Abstract

The last few years have seen a spate of pension reform programs in many countries. A common feature of this is that almost all involve the concept of fully funded defined contribution individual retirement account pension. In defined contribution pension, the pension benefit to be paid from the date of retirement, or from the specified age, being not defined, the members have certain expectations about the pay out, such as being able to get certain 'targeted' pension. However, with the increasing life-span making the post retirement period very close to working life, the members' expectations go beyond that and this poses great challenge to the pension providers, not only in terms of changing demographic and economic environment but also in terms of meeting the members' expectations, such as : greater freedom to choose optimally performing assets to maximize the income; freedom to vary their investment choice during retirement to reflect any change of attitude to risk and reward; and to have insurance against longevity but with flexibility about the level of income. This has necessitated fresh thinking about the post retirement pay out structure to accommodate changing customer attitudes and requirements in retirement and more importantly sharing of longevity risks and economic risks between the pension providers and pensioners.

1 Background

1.1 Pension schemes around the world have been coming under increasing pressure as a result of combination of factors, foremost amongst which is the demographic changes. This has been driving governments around the world to undertake pension reforms and the last few years have seen a spate of pension reform programs in many countries. A common feature of these programs is that almost all involve the concept of fully funded defined contribution individual retirement accounts, drawing on the Chilean experience, although with a variety of individual characteristics.

1.2 In 1994, the World Bank published a book on pensions and social security titled *Averting the Old-Age Crisis* (World Bank, 1994). Developed by a team of academic economists and the World Bank experts, the recommendations contained in the book have been widely promulgated as offering a blueprint for countries seeking to reform their social security pension arrangements. Looking to the problems afflicting publicly run social security schemes, the World Bank team advocated a solution based on :

- A relatively modest publicly run first pillar, with flat-rate benefits, either on a contributory basis or means-tested and tax-financed;
- A mandatory second pillar, based on a fully funded defined contribution system, with individual accounts and a competitive market of privately managed funds; and
- A voluntary third pillar of funded occupational and personal pension provision.

1.3 The solution restricted the first pillar to a modest safety net with the whole focus on self-financing of old age income through defined contribution fully funded individual retirement accounts.

1.4 The first pillar addresses redistribution and social safety net issues directly, and provides basic support for everyone. In developing countries, basic support would typically mean subsistence level assistance. This pillar is publicly managed and tax-financed. In India, the

government pays a modest assistance of Rs 75 per month to the destitute aged 65 and above. The second pillar facilitates building up of old age income through sustained savings during working life. The government provides institutional and financial infrastructure to help this process. This pillar could be publicly managed, as EPF and EPS 95 in India are, or could be privately managed, as the proposed New Pension System (NPS) would be. The third pillar is voluntary and is generally fully funded and privately managed. There has been variation in the definition of “second” and “third” pillar. In Europe and some other parts of the world, the second pillar refers to occupational pension plans and the third to personal pension plans, whether mandated or voluntary, while in the North and South America and some other parts of the world the second pillar refers to mandated pensions and the third pillar to voluntary pensions, whether occupational or personal. Generally, the occupational pensions, whether forming part of second or third pillar, have been defined benefit pensions and the other pensions are generally defined contribution pensions.

2. Pension Design

2.1 In a defined benefit pension scheme, the pension pay out is defined in the scheme rules and is payable for life of the pensioner and generally thereafter to the surviving spouse. This essentially means that the pension fund or life insurer bears the post-retirement longevity risk and the investment risk, depending on whether the fund pays the pension or annuities are bought by the fund from life insurer. The members are protected against these risks, however long they live. The expected future cash-flows involved in paying out pensions are taken into consideration in deciding the investment policy for the fund. The pay-out phase thus can be regarded as an integral part of the pension scheme. In such a situation, the pension scheme members’ expectations are that the benefits as have been accrued by rendering service would be paid as per the scheme rules.

2.2 On the other hand, most defined contribution pension schemes are segregated into the investment (accumulation) phase and the pay-out (decumulation) phase, often with different entities providing the respective services. The pension benefit to be paid from the date of retirement, or from the specified age being not defined, the members have certain expectations about the pay out such as being able to get ‘targeted’ pension. However, with the increasing life-span making the post retirement period very close to working life, the members’ expectations go beyond that and this poses great challenge to the annuity providers, not only in terms of increasing longevity but also in terms of meeting the members’ expectations which could be about flexibility in pay out amount / flexibility in asset allocation during pay out phase.

3 Emerging Annuity Market

3.1 In the context of what has been mentioned in para 2.2, the pay out phase assumes critical importance in defined contribution pensions. While the annuity business is minuscule in most countries, in countries that have instituted mandatory retirement savings schemes it is growing rapidly. Typically, these countries constrain the types of pay outs that people can choose upon retirement, making annuities one of the very limited set of choices.

3.2 In Australia, annuity business is developing only now, as a consequence of its new pension scheme that requires subscribers to accumulate retirement savings that they can use either in gradual withdrawals or in annuity purchases.

3.3 In Chile there was no annuity business prior to introduction of the defined contribution individual retirement account pension system, but later that changed drastically. Currently, when workers retire in Chile, they are required either to leave money with their Pension Fund Manager (PFM) for programmed withdrawals, to take an immediate annuity or to purchase a deferred annuity with programmed withdrawals in the meantime. Buying an annuity provides

investment and longevity insurance. Annuities have other advantages in Chile, viz.: if a worker has enough savings to purchase an annuity that exceeds 50 % of his average wage over the last ten years, he can “retire” early and stop contributing to the mandatory system, while continuing to work. If the annuity exceeds 70 % of his average wage, the rest of the savings can be taken out as a lump sum. These measures have boosted retirement savings as also the annuity business.

3.4 In Singapore annuity market started in 1987 when annuities were made one of the allowable options for the retirement savings that workers were required to accumulate in their retirement savings account. At the age of 55, workers are required to set aside \$ 60,000 to buy deferred annuity, to deposit with a bank or to leave with the Central Provident Fund (CPF). If they buy an annuity they acquire longevity and investment insurance that they would not have had otherwise.

3.5 In India, till 1987, annuity business was confined to annuities purchased by the occupational pension fund trustees and the occupational pension schemes also were not significant in number, being mostly confined to MNCs and some large Indian corporates. Further, there was hardly any personal annuity business till 1987. In 1987, when the government allowed purchase price for specified immediate annuity and premium for specified deferred annuity of LIC up to Rs 40,000/- to be paid from pre-tax income, the annuity business picked up. The sales dramatically dropped when this tax treatment was withdrawn in 1992, and again picked up when premium for specified deferred annuity of LIC up to Rs 10,000/- was allowed to be paid from pre-tax income. However, the main boost to immediate annuity business will come from mandatory annuitisation envisaged in the defined contribution pension environment.

3.6 These are just a few examples of markets which have mandatory annuitization. The challenge for countries that have reformed their accumulation phase of pensions will be to design decumulation phase that is consistent with peoples’ preferences. This means that sufficient product variety should be permitted to satisfy diverse preferences and any restrictions should be thought through carefully.

4. Lengthening of Payout Phase - Issues

4.1 **Over** the years, the whole focus was on designing and implementing accumulation structures and not much thought was given to the pay out phase issues. However, as mentioned earlier, because of ever increasing longevity which is driving the post retirement period close to pre-retirement period, issues arising out of the longer pay out phase are coming to the fore. The annuity providers have therefore to meet the challenges posed by these issues. These could be listed as :

- changes in demographic environment leading to longer pay out phase;
- changes in economic environment making it onerous for the annuity providers to guarantee life long payments;
- customer expectations arising from longer pay out phase, both in terms of the pay out structure and asset allocation.

4.2 This paper attempts to analyses these issues and the solutions that could meet these challenges. It may be mentioned here that longer the pay out phase, the greater would be the intensity of these challenges.

5. Changes in Demographic Environment

5.1 When Bismark invented State pension in 1889, expectation of life at birth was 45 years and the retirement age was 65 years. Over the years, expectation of life at birth in most

countries has been in the range of 65 to 75 years and this in itself has put pressure on pension systems. In India, as per 1991 Census, expectation of life at birth was 57.7 years for male and 58.7 years for female and as per 2001 Census, this increased to 62.3 years for male and 65.3 years for female. The expectation of life in India at age 60 for general population as per 1991 census was 14.5 years and it increased to 17.5 years as per 2001 census. These being the expectations of life of general population, the expectation of life of pensioners would certainly be higher, as the pensioners form a select group having more favorable lifestyle. In fact, the expectation of life at 60 for occupational pensioners, as per LIC (1996-98) annuitant mortality, is 82 years.

5.2 There is another dimension to the pensioner/ annuitant mortality that influences the longevity risk borne by the providers. This dimension is the adverse selection bias associated with longevity risk. Most defined contribution pension regulations do not specify annuitization. Those that do, allow flexibility, e.g. the defined contribution individual retirement account pension introduced for the new Government of India employees joining service on after 1st January 2004 have to compulsorily annuitize at least forty percent of their accumulation. This gives scope for exercising of selection by the subscribers against the life insurer chosen by them for annuitization as those who believe that they are likely to live longer than the population of the same age will generally annuitize more than forty percent of the accumulation. This happens because of informational asymmetry between the provider offering the annuity and the prospective annuity buyer. Consumers know more about their health status and life expectancy than insurance companies, but “good” risks for annuity business (who will die young) are unable to signal this to insurers to secure a better rate, so they withdraw from the market, leaving the insurers only with the “bad” risks (who will live long) , with greater than average longevity. Asymmetric information is not the only reason for adverse selection. Another reason may be that voluntary annuities are a “luxury” item with a high income elasticity of demand as wealthy people, who have greater longevity, are disproportionately large buyers. Further, mortality tends to improve over time and there can be severe financial consequences if the annuity providers underestimate mortality improvement. In his paper “Annuity Markets: Problems and Solutions”, published July 1999, David Blake, Director, Pensions Institute, University of London, has said that “Mortality forecast errors of up to twenty per cent over intervals as short as ten years are not uncommon and some insurance companies in the UK have underestimated the average life expectancy of their pool of annuitants by up to two years.”

5.3 From the customer perspective, the real advantage of life annuities is that they offer insurance against longevity. Life annuities ensure that the money will not run out, however long the pensioner lives, with the insurance company taking the risk that the pensioners on average will live longer than allowed for in the annuity pricing. The annuities also offer a highly effective strategy when there is a strong bequest motive, since annuitising to the extent of providing an adequate income to live in retirement can then free up the remainder of the pensioner’s wealth for other purposes. In India, there is a strong preference for annuities with return of purchase price as this annuity mechanism allows an annuitant to leave purchase price for his family on his death. In this annuity design, demographic changes do not materially affect the provider.

5.4 From the provider perspective, writing annuities carries very great risk as it involves estimating future improvements in mortality over long periods in circumstances in which advances in scientific and medical knowledge appear likely to have a substantial but unpredictable impact. Taking recourse to risk transfer mechanism is also not possible in annuity business because there is hardly any supply of reinsurance or capital market products to facilitate laying off of long-term longevity risk.

5.5 The changing perspective of the annuity providers and annuity buyers caused by the changing demographics have made traditional annuity products unpopular and in many countries retirement benefits based on self-insurance of longevity risks are gaining grounds. The pay out design based on sharing of longevity risk between the providers and annuitant also influence the capital requirement of annuity providers and such designs may reduce their capital requirement.

5.6 Gregorio Impavido, Craig Thorburn and Mike Wadsworth in their World Bank Research Working paper released in February 2004 have said that "Predicting mortality improvement remains problematic. In some cases, mortality measurements are hampered by data problems. These can be further exacerbated at older ages rendering this of particular interest with respect to retirement income analysis. At most advanced ages, the age pattern of mortality is not well understood as is desirable. The rate of decline in mortality at these ages is, as a consequence, also unclear. As a result, efforts to improve data collection and to research the influences on mortality continue with respect to these aspects.

Even where the data is more reliable, the pattern of improvement over time, as observed through twentieth century, has been variable and its prediction is problematic. The rate of improvement varies from country to country; it varies by groups of the population such as by age group or sex. Developing an improvement assumption for the future projection of mortality has met with considerable uncertainty. Unfortunately for the providers of annuities, the experience in both developed and developing countries has been that the rate of improvement is often found to have been underestimated. Underestimation of improvements means the companies have to increase provisions – in effect meaning that capital is ultimate protection against this risk.

Companies can respond to this risk by allowing for adequate or even conservative (in this case conservative is equivalent to aggressive expectations) mortality improvement in pricing and reserving. However, the resource to provide beyond the even conservative assumptions in the liability valuations will ultimately be capital. Prudential regulation should require liability valuations which are sound and minimum capital requirements that provide an adequate buffer over and above these provisions. "

5.7 It will be seen from the above excerpt from the World Bank Research as to how difficult it is to estimate improvements in future mortality and how it gets underestimated. This would get compounded in India, as in India we do not have any worthwhile annuitant mortality data. Further, with the current annuity business being very small, it would take some years before worthwhile annuitant mortality data by sex, social strata and geographic region is built up and investigated; there being significant differences in annuitant mortality by sex, social strata and geographic region.

5.8 It is in this context that alternate pay out structures are getting designed that facilitate transfer of longevity risk to the annuitant or sharing of longevity risk between the provider and the annuitant. Such designs are discussed later in the paper.

6. Changes in Economic Environment

6.1 Immediate life annuities are optimal for investment in retirement in the absence of a bequest motive as immediate life annuities are an income maximization strategy for someone at the point of retirement. However, from the provider perspective such annuities are burdensome in the changing economic environment. In an ideal situation, the provider would match its pay out liability by buying assets that would provide income stream which could match the liability outgo. However, the situation in reality is far from ideal and it is not generally found possible to find investment instruments that would free the annuity providers from reinvestment risk.

6.2 The availability of government bonds and corporate bonds in different countries is aptly described by the Development Research Group, World Bank, in its paper, "Annuity Markets in Comparative Perspective : Do Consumers Get the Money's Worth". The relevant excerpt from the paper is given herein:

"Interest rates. Ideally, the term structure of interest rates should be used to discount future annuity payments, and these were available for long durations in the US and UK. The reason for using the term structure is that the relevant interest rate is often different in the short run and the long run, and annuity payments are received in both periods, hence different discount rates should be used.

If annuity is viewed as guaranteed and risk-free, the government bond rate is usually appropriate. Alternatively, if some risk is perceived to be involved, the discount rate should be higher. Earlier papers on this topic used the "AA" corporate bond term structure as the alternative 'risky' rate.

However, in most of the countries in our study, government bonds of long term duration were not available and the corporate bond market is thin. For example, in Australia, which has one of the better developed financial markets, the longest government bond duration is 12 years. In Singapore 10 years is the limit on government bonds, in Chile 18 years. In Israel government bonds have a maximum duration of 15 years and the yield curve has virtually no slope (in contrast to Switzerland and Singapore which have steep slopes). In cases where duration was limited, we extrapolated forward the last government bond rate into future.

The corporate bond market is even more limited and with even less duration. In Australia, Israel and Singapore, where the corporate market is too thin to yield a term structure, 1 % was added to the government bond rate to get 'risky' rate. In Switzerland, where corporate bonds have only 10 years' duration, .9 % was added to the government bond rate after 2008. In the UK, where corporate market is well developed, the government-corporate differential of .69 % was derived from the first 10 years of experience and extrapolated forward; in Canada a similar procedure led to a differential of .8 %. In Chile, mortgage bonds were used as the substitute for corporate bonds, and a constant differential of 1.09 % was maintained after 15 years."

6.3 In India, very long dated government securities, i.e. those having maturity exceeding 20 years were in vogue in the seventies and the eighties, while in early nineties most of the government securities issued have been in the 5 – 10 year maturity bucket. Very recently, securities of 15 and 20 year maturity have been issued. The issue of bonds by public sector undertakings began in a big way in the late eighties when the Central Government stopped/reduced funding of these undertakings through the general budget. Typically, these have maturity ranging between 5 – 10 years. Corporate debentures have maturity ranging from one to ten years. Long term debentures are rarely issued. It will be seen from this that the maturity profile of debt instruments is generally similar to that obtaining in most other countries.

6.4 Thus investment risk cannot be adequately diversified by the annuity provider as the liabilities of the annuitant pool will generally be of duration longer than that of the available assets to match the risk. This necessitates reinvestment and associated reinvestment risk. Providers usually respond to this risk through the holding of capital and then lobbying for longer term investment assets.

6.5 The annuity providers are also exposed to other usual investment risks like credit risk, liquidity risk and possibly currency risk and may require capital support to manage these risks. It is in the context of these risks that the annuity providers are looking to evolve

mechanisms in the product design for transfer of the investment risks to the annuitants. Such designs are discussed later in the paper.

7. Customer Expectations Arising From Longer Pay Out Phase

7.1 The increased longevity has resulted in longer pay out period and the longer pay out period in its turn has created certain expectations amongst the pensioners necessitating a fresh look at the pay out structures. These pensioner expectations could be listed as under:

- greater freedom to choose optimally performing assets to maximize the income;
- freedom to vary this choice during retirement to reflect any change of attitude to risk and reward; and
- to have insurance against longevity but with flexibility about the level of income.

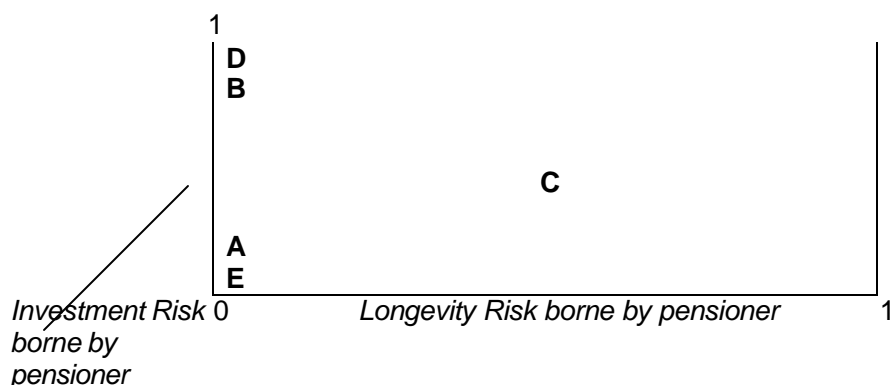
7.2 The customers today do not subscribe to the traditional thinking of progressively reducing the riskier assets from the asset portfolio as one advances in age and to get all assets converted to fixed income investments at the time of retirement. They would like to have freedom to choose the assets after pay out has commenced. In Lifestyle Fund, by the date of retirement all the assets get converted into fixed income assets and to that extent it acts as a constraint. People are today questioning that if equity is a good asset class during the accumulation phase, why it is not considered suitable at the pay out stage. The product design has therefore to allow for freedom to choose assets as are considered suitable.

7.3 As the pay out period has lengthened, it is possible that the pensioner attitude to risk and reward changes over that period. The expectation is that the product design should allow for reflection of this change in the attitude on the asset portfolio. This necessitates that the pensioner should have flexibility to change the asset portfolio after the pay out has commenced.

7.4 Every retiree would like to have pay out in retirement that would continue during his lifetime, yet at the same time he would like to have flexibility to vary his income. This, however, has to be within limits; the upper limit is to ensure that the pensioners do not exhaust their assets during their lifetime and the lower limit is generally a tax authority requirement to ensure that there is no excessive deferral of income. These designs facilitate pensioners drawing lifelong income, within specified limits, as per their requirement. Such designs are discussed later in the paper.

8. Risk Sharing Arrangements

8.1 Borrowing an idea from the paper titled "A Conceptual Framework for Retirement Products: Risk Sharing Arrangements Between Providers and Retirees" by Gregorio Impavido, Craig Thorburn and Mike Wadsworth, the following is a diagrammatic representation of conceptual framework for sharing longevity and investment risk between the providers and the pensioners.



In this diagram:

- A** corresponds to a guaranteed life annuity with both investment and longevity risks borne by the provider;
- B** corresponds to a structure where both investment and longevity risks are borne by pensioner – a case of self-insurance;
- D** corresponds to a structure in which investment risk is borne by the pensioner and longevity risk is borne by provider;
- E** corresponds to a structure in which investment risk is borne by the provider and longevity risk is borne by pensioner; and
- C** corresponds to a structure in which investment and longevity risks are reviewable at fixed periodicity.

The pay out structures generally promoted are represented by “A” and “B”. That is either the provider (pension fund or insurance company) bear both the investment and longevity risk or the pensioner bear both the risks, e.g. making withdrawals from investment fund.

9. Pay Out Phase Product Structures

9.1 In this part of the paper, the product structures corresponding to the risk sharing arrangements A, B, C, D and E are outlined.

9.2 Pay Out Structure A: This is the traditional annuity structure in which both the investment and longevity risks are borne by the provider, i.e. pension fund or life insurer. While this design protects the annuitant if he were to live long and also gives him an assured income throughout his life, it is burdensome from the provider perspective because of guarantees and also does not meet the expectations of the annuitants in terms of flexibility in income and flexibility in asset allocation.

9.3 Pay Out Structure B : In this structure, both the investment and longevity risks are borne by the pensioner. This is essentially a income draw-down or programmed withdrawal. Since the pensioner is in control of the assets, this structure offers freedom to the individual in asset allocation and also allows greater flexibility in deciding the pension amount. There would, however, be a limit on the maximum amount that can be withdrawn so as to control consumption and ensure that assets are not exhausted. In some jurisdictions, a minimum is also prescribed because of tax authority requirement to ensure that there is no excessive deferral of income. In this structure, the fund to the credit of the individual at the beginning of a year is divided by the expectation of life for an individual of that age at the beginning of the year to decide the maximum amount that can be withdrawn in that year. The maximum and minimum amounts are reviewed every three years in the context of the balance in the fund. Sometimes, a slight variation is made to this structure by taking a proportion of the

fund, say 85 per cent, for operation of the type specified above and at an advanced age of 80 a traditional annuity is purchased for the pensioner with the balance amount. Alternately, a deferred annuity with return of premium on death during deferment period vesting at age 80 is provided by utilizing part of the accumulations and the balance amount utilized for income draw-down during the deferment period. These structures provide flexibility in income as also in asset allocation. Further, this arrangement also does not require the retirees to hand over the whole of their pension savings to an insurer and retain the capital with them that can be inherited by their family.

9.3.1 The major disadvantage of this design which totally relies on self-insurance is that the pensioner may well end up with insufficient income in the long term because of poor investment performance of the balance of the fund. It is also possible that a cautious pensioner may keep back too much of the fund so as to build up reserves for later years or to meet the contingency of poor investment performance.

9.3.2 This structure has recently been introduced by one of the private sector life insurer in India. While the market response is not yet known, it is likely to get favourable response because the pay out is in the form of “maturity proceeds in installments” and would not be taxed in the hands of the recipients. Even when EET system of taxation is introduced, it would be an appealing structure because the tax on pay out would be at a lower rate as the payment would be “maturity proceeds in installments”, whereas conventional annuity would be taxed at normal rate.

9.3.3 Another structure that has a slight variation from the arrangement described above, is the “Annuitised Fund”. In this structure, the fund is unitized, with each cohort of pensioners bearing the mortality risk and individuals bearing their own investment risk. In a traditional annuity the forfeited benefits of those who die gear up the benefits of survivors. In the case of annuitized fund, this “cross subsidy” is made explicit and is expressed in the form of “survival credits”. When a pensioner dies, his units are shared out equally to the survivors in the cohort. The surviving members of the cohort benefit from mortality worse than expected and lose if mortality improves. This process is likely to become unstable as the number of survivors fall and because of this, traditional annuities are required to be purchased with the remaining balance of funds to the credit of each survivor at an advanced age, say 80, as mentioned in para 9.3. There is a maximum and minimum on the number of units to be utilized for pay out. The maximum is worked out as in the case of variable annuity.

9.4 Pay Out Structure C: This is essentially the traditional annuity structure. The ever improving mortality and the changing economic environment make it difficult for the providers to estimate the behavior of these elements over the lengthening pay out period. The providers therefore commit the annuity rates only for short periods; say three to five years, and the annuity rates are reviewed at the end of that period. This limits the guarantees of the providers. While this pay out structure protects the providers, it exposes the pensioners to variation in pension amount without having the benefit of flexibility in pension payment and right to vary asset allocation. However, this design also benefits the pensioners if the annuity rates were to improve. This structure was introduced in India by one of the private sector life insurer but is reported to have not invoked favourable response from the market.

9.5 Pay Out Structure D : The best example of this is variable annuity. In this structure, the pensioner has the benefit of varying asset allocation and also have insurance against longevity. In this structure the unitized fund to the credit of a pensioner is divided by life annuity for age of the retiree at zero rate of interest, i.e. the then expectation of life of the retiree, to arrive at the annuity payment. This is in terms of units and the actual amount in currency terms depends on the unit NAV. As will be seen here, the pensioner bears the

investment risk but the provider bears mortality risk, including the risk of improvements in mortality. This structure does provide to the pensioner freedom of asset allocation but the pay out in terms of units is fixed and no flexibility is possible. The pensioner is also exposed to the risk of varying annuity amount as the annuity amount depends on the NAV of the units.

9.6 Pay Out Structure E: In this structure, the provider guarantees return on investment but the pensioner has to bear the longevity risk. Essentially, this is an arrangement in which regular withdrawals are allowed, within maximum and minimum specified, with the provider guaranteeing investment performance of the fund.

10. Summing up

10.1 The pension providers have concern about limiting guarantees, reducing the capital cost of providing guarantees and increasing the profit margin, while no facility is available to transfer / share the risks through reinsurance and capital markets. The pensioners want to have insurance against longevity and at the same time have flexibility in pension pay out and freedom in choice of assets and asset allocation. The industry is trying to evolve structured pay out products that would manage the conflicting requirements of the providers and pensioners.

10.2 Another macro level issue that needs to be addressed is that the high volume of annuity business, which could arise in the development of a funded pension system with compulsory annuitization, may result in an unhealthy concentration of risk from this business in life insurance industry. As we go along, longevity risks cannot be avoided but what needs to be ensured is that life insurers protect themselves against this by prudent allowance for future improvements in mortality in both pricing and reserving and by designing products that would achieve balance of risks between pensioners and providers.

10.3 As the defined contribution pensions take roots in India, these issues would come to the fore. Currently, one-sixth of the world population is in India, but the proportion of elderly population in India is one eighth of the world's elderly population. This is because of high birth rate and high death rate, but this is changing and the rate of improvement in longevity in India would be higher than that in the developed countries and estimating the improvement in longevity in future would be a challenging exercise. These challenges are best summed up in a quote from Chris Daykin's paper "Annuities and alternative ways of providing retirement income" presented by him in November 2004 at the Pension Benefit and Social Security Seminar of the Institute of Actuaries of Australia, viz. "The future probably lies in the development of different forms of risk-sharing between pensioners and annuity providers. These could offer both greater flexibility to the pensioner (at the expense of some greater level of risk) and some moderation of the risks underwritten by the providers. Developing new products and new mechanisms for risk-sharing will be the challenge of the next decade."

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