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## ABSTRACT/RÉSUMÉ

### **National annuity markets: features and implications**

This paper describes a number of national annuity markets, the types of products typically available, the demand for these products, the value for money on offer and the dynamics of the supply side. It explores supply and demand characteristics, asking what the main forces are that drive these dynamics and how they might be recognised and responded to by policymakers

*JEL codes: D11, D14, D91, E21, G11, G38, J14, J26*

*Keywords: Annuity markets, money's worth ratios, supply and demand of annuities.*

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### **Marchés nationaux des rentes viagères: caractéristiques et implications**

Ce papier décrit un certain nombre de marchés nationaux des rentes viagères, le type de produits disponibles, la demande pour ces produits, la valeur de l'argent sur l'offre et la dynamique de la demande. Il explore les caractéristiques de l'offre et de la demande, recherchant quelles sont les forces guidant cette dynamique et comment elles pourraient être reconnues et traitées par les responsables politiques.

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*Mots clés: Marchés des rentes viagères, money's worth ratios, l'offre et la demande des rentes viagères.*

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# NATIONAL ANNUITY MARKETS: FEATURES AND IMPLICATIONS

by Rob Rusconi<sup>1</sup>

## Executive summary

Annuity markets are growing in importance and will continue to do so for some time. The systematic transfer of investment and longevity risk from institutions to individuals taking place across the world stimulates the need for financial vehicles that convert accumulated retirement savings into an income stream appropriate to protect against these risks.

This paper describes a number of national annuity markets, the types of products typically available, the demand for these products, the value for money on offer and the dynamics of the supply side. It should assist policymakers, in both fledgling and mature annuity markets, to understand the types of problems affecting the demand for and supply of annuities and the range of options available from other parts of the world.

In an effort to describe the variety of national annuity markets, three broad categories are proposed. Markets of the immediate annuity type, the United Kingdom, United States, Canada and South Africa, for example, more recently joined by Chile and other individual account reformers, are dominated by annuities that are purchased at retirement, converting a lump sum into a life time income stream.

Guaranteed deferred annuity markets form a second group. These products, for example, in Denmark, Belgium and Germany, are typically purchased in the form of deferred annuities during the working years. They attract a relatively low guaranteed return throughout the accumulation and payout phase with bonuses added as investment returns emerge. Annuities in the Netherlands show attributes of both of these market types.

A third group includes small annuity markets, like Hungary and Mexico, and those with unusual characteristics, Switzerland and Singapore, for example.

The development of annuity markets is subject to a range of external factors, the most important of which appear to be the design and scale of the social security system, the occupational retirement system and any mandatory saving framework, and the impact of tax incentives. Policymakers should consider whether there may be aspects of the broader old age system that are inhibiting inappropriately the development of annuity markets.

Annuity products vary considerably. Some are purchased at retirement; some in the form of deferred annuities during the working years. Increases in payment take on a number of different profiles, and the

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types of guarantees provided in the event of the death of the annuitant a variety of forms. Design innovation is taking place in a number of countries. Some of the more recent offerings focus on the natural tension between longevity insurance and protection in the event of death. Others seek to offer more choice on the underlying investments while aiming still to provide appropriate protection against market movement, for most customers the priority after retirement.

A review of the literature on money's worth ratios and the insurance value of annuities suggest that these products offer broadly acceptable value for money and that they continue to provide longevity insurance with utility to the customer comfortably in excess of the price. Some evidence of significant pricing spreads hints at poor competition dynamics, but this is scattered; providers in most markets appear to compete well on price.

The demand for annuities continues to be low, however, a well-established problem with many possible causes. Evidence of two of these is considered in this paper, poor consumer understanding and inflexible product design. Ironically, efforts to address these two factors may work against one another. While it is tempting to conclude from the second that customers should be offered significantly improved choice, weak consumer understanding of the subtleties involved in the annuity decision may damage the prospects for soundly priced and smoothly operating markets in the face of increased complexity.

Meanwhile, evidence of supply-side problems continues to emerge, notably in the mature immediate annuity markets where provider numbers show signs of shrinking. The same problems do not appear to exist in the newly opened immediate annuity markets or in their mature deferred annuity counterparts. This suggests that models that share risk between the provider and customer may attract better interest from suppliers, as long as it is acknowledged that such models may compromise the protection offered to customers and should be considered with care. If customers are well informed and able to make sound decisions across a range of options, carefully limited product options may provide the means to expand the demand for and supply of annuity products.

Perhaps the most important thought that could be provided in conclusion is that annuity markets differ from country to country, that customers, suppliers and products vary, and that policymakers must seek to understand the issues in their own country before applying apparent solutions from others.

## I. Introduction

Pension reforms in many countries have completely changed the landscape of provision for old age. Most of these changes have increased the extent to which citizens are saving for retirement in individual vehicles, replacing or complementing the old age support that they receive from social security and employment-based arrangements. The trend in occupational plan design towards the defined contribution type has exacerbated the extent to which individuals bear the risks associated with providing for their retirement.

This expansion of private-sector saving – and the associated need for risk management at an individual level – needs to be complemented by the development of appropriate vehicles for converting this accumulation into an appropriate means of surviving in old age. Addressing this issue has been regarded as not as urgent as establishing the accumulation mechanisms, and there is some merit in this prioritization. Growing numbers of participants in these new systems are retiring, however, or will begin to do so soon, and this pool of retirees will continue to expand rapidly. This will stimulate the demand for appropriate means for converting savings into income and render more urgent the need for coherent policy in post-retirement vehicles.

At the same time, not all is well in the larger annuity markets. While the low demand for lifelong annuities has been strongly established in the literature, and is reasonably well understood, it is not clear what ought to be done about it. Annuitization in the world's largest annuity market, the United Kingdom, continues to be broadly unpopular, despite the efforts of policymakers to improve the flexibility granted around the mandatory requirement to convert savings to a lifelong annuity. Meanwhile, despite the scale of the market, and prospects for continued growth, supply-side concerns abound.

This paper aims to support the development of policy around the post-retirement options by describing various annuity markets around the world, together with their products, customers and suppliers. It aims to contribute to existing thinking by describing, in broad categories, but with supporting detail, the main forms taken by annuity markets in different jurisdictions, whether undergoing reform or not.<sup>2</sup> It explores supply and demand characteristics, asking what the main forces are that drive these dynamics and how they might be recognised and responded to by policymakers.

The discussion should be useful both to policymakers in well-established markets, giving them a sense of how their experience compares with the corresponding experience in other markets, and to those responsible for designing or stimulating new markets for annuity products.

The paper is laid out as follows. The next section describes the distinct attributes of the largest national annuity markets, breaking these markets into clusters with broadly similar characteristics, but picking out unusual features in some markets. It is followed by a brief consideration of the factors most likely to influence the development of annuity markets. This provides context for the descriptions that follow, demonstrating that annuity products and pricing mechanisms cannot be regarded in isolation of the environment within which they develop. Section 3 describes the range of products available across these markets, with emphasis on the primary product features in each, but

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<sup>2</sup> Its primary focus is the market for annuities payable for life, whether purchased at retirement with accumulated savings or, in the form of a deferred annuity, during the working life of the customer, and the dynamics of the markets for these products. References are made to alternative retirement vehicles, lump sums, term annuities and programmed withdrawals, and to other aspects of the operation and regulation of these products, but these subjects are covered in the companion papers referred to in the previous footnote.

comments also on some of the innovations taking place across the world. Section 4 considers the characteristics of annuity pricing, the value provided by annuities and the dispersion evident in prices. The following two sections build on this, exploring the impact of these dynamics on the demand-and supply-sides of the market, respectively. Section 7 summarises the main findings of the paper and provides some concluding thoughts, particularly considering the most important design and regulatory trade-offs faced by policymakers. This is supported by two annexes describing aspects of annuity markets in more detail.<sup>3</sup>

## II. Annuity Market Characteristics

One of the most significant challenges to overcome in setting out a description of global annuity markets is the variety across countries. From the historical development of social security and occupational retirement funds to the economic and cultural nuances that shape national priorities and the capacity to supervise, countries show tremendous diversity in the factors that shape their post-retirement landscape. It is difficult to classify annuity products without showing that the respective contexts within which these products have been designed can be very different.

This section describes some of this variety in broad terms by considering

- the most prevalent main types of annuity market, with examples of each,<sup>4</sup> and
- the factors that have shaped the development of these markets.

### *Immediate annuity market type*

The first broad market group considered is what may be referred to as the immediate annuity market type. The annuity markets in countries that fit this type are generally large, relatively unconstrained from a price and product design perspective, sometimes supported by compulsory saving and in many instances by mandatory annuitization, and dominated by immediate rather than deferred annuities.<sup>5</sup>

This group is led by the **United Kingdom**, with the largest and most diversified market for immediate life annuity products anywhere in the world. This market has been supported by a long history of occupational retirement funds and actuarial risk-management techniques and a good understanding of late-life mortality risks.<sup>6</sup>

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<sup>3</sup> Annuity markets are changing rapidly. While every effort has been made to ensure the accuracy of information, errors in market descriptions may exist in this text, with apology for any misrepresentation resulting.

<sup>4</sup> The paper is designed to provide a sense of the primary characteristics of annuity markets and refers to individual countries where they provide interesting examples of the features described. It is not intended as a reference source for detailed market descriptions.

<sup>5</sup> Refer to the OECD description of annuity product types. Immediate annuities exchange a capital amount for a stream of income that commences at the time of the exchange. Under deferred annuities the start of the income stream is delayed and the capital may be built up through the payment of a series of premiums.

<sup>6</sup> Research into the mortality experience of the United Kingdom population and many of its sub-groups like insured lives and annuitants has been taking place for many years under the guidance of the actuarial profession and Government Actuary's Department. This process has not been perfect. It did

It has grown more rapidly over the course of the last two or three decades through the process of privatization of hitherto state saving, as members of the State Earnings Related Pension Scheme were permitted to opt out of paying contributions to this social security arrangement on condition that they contributed to an appropriate private-sector alternative. It has also been stimulated by the shift of occupational arrangements from defined benefit to its defined contribution counterpart and also the growth of personal saving. As one of the most important conditions for tax incentives on retirement saving contributions is mandatory annuitization of most of the accumulated saving at or before a stipulated age, these changes built the foundation of a very large annuity market, currently attracting over GBP 8 billion a year in single premiums purchasing immediate annuities.<sup>7</sup>

This market is not only the world's largest, but it leads the way in product variation and risk differentiation as well. All of the lifelong annuity products types are available, together with a thriving market for programmed withdrawals, to the extent permitted by the regulation.<sup>8</sup> A significant proportion of annuities are sold on terms that are more favourable than the standard set of terms to customers who are expected, on average, to die earlier than other annuitants due to health impairment.

Other countries have broadly similar characteristics but smaller annuity markets. **Canadians** enjoy reasonable social security coverage but also use a variety of legally defined vehicles to save for their retirement and many of these are defined contribution or pure individual account in nature. Immediate annuities strongly dominate their deferred annuity counterparts and are available in significant variety of product type with year-to-year increases, spouse's pensions and guarantee terms generally available at the option of the customer.

The **United States** also has a substantial market for annuities, though significantly smaller than its United Kingdom counterpart relative to the size of the economy. This market has provided consistent and often-cited evidence that, given the choice, people do not choose to annuitize as expected to when attaining the end of the working lives.

The United States experience also illustrates one of the slightly challenging aspects of annuity terminology. The so-called 'annuity market' in that country covers both the accumulation and payout phase, but these products could not really be regarded as 'deferred annuities' in the sense in which this term is used elsewhere to describe an arrangement providing a form of guarantee from the time of the premium through to the post-retirement period.<sup>9</sup> Individuals purchasing 'annuities' are not required to receive their accumulated benefit in the form of a conventional annuity. Many do not do so, preferring instead to withdraw their savings in the form of cash.<sup>10</sup> Purcal (2006) cites American Council of Life

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not, for example, prevent widespread underestimation of mortality improvements over the last decade or two, particularly affecting the elderly.

<sup>7</sup> HM Treasury (2006) shows the rapid growth of this market. In the ten years from 1994 to 2004, new premium income grew from an annual GBP 2.6 billion to GBP 7.5 billion.

<sup>8</sup> Participants may take a lump sum at retirement and may postpone annuitization of the balance until a specified age, currently 75.

<sup>9</sup> *"The deferred or variable annuity, although it has both an accumulation phase and a distribution phase, is essentially a tax-favored investment vehicle similar to a mutual fund. Typically, the policy holder may choose a lump-sum withdrawal option after the policy has reached a specific maturity date, so that an investment in a variable annuity entails no obligation to annuitize."* (Mackenzie, 2006:23)

<sup>10</sup> Refer to LIMRA (2006:11) for example, which states that "... *deferred annuities still constitute almost all annuity sales, and annuitization of these contracts is far less common than cash surrenders or withdrawals.*" Differences like these make it very difficult to compare market size across countries.



Insurer figures of inflows to annuities in 2004 of \$301 billion (ACLI, 2005) but quotes Blake's (2001) estimate that around 2 – 3 billion dollars are annuitized.

The United States immediate annuity market is sufficiently substantial nevertheless to sustain a large number of providers and a good variety of products. Most types of immediate annuity are available in this country. Variable annuities, providing tax-effective but flexible investment vehicles for the build-up phase, are growing in popularity and these also permit a range of options at retirement, on conversion of the accumulation to an annuity. Impaired life annuities are available, but not widespread.<sup>11</sup>

**South Africa** provides another example of a large immediate annuity model. A surprisingly large market<sup>12</sup> has been sustained by the tax-favoured mandatory annuitization vehicles to which much of retirement saving has been directed. This market is characterised, like its United Kingdom counterpart, by significant variety of product design and choice and, like the United States, by the confusing habit of referring to tax-favoured individual products in the build-up phase as 'retirement annuities'.

A relatively small immediate market in **Ireland**, historically more significant, is somewhat hampered by the growing popularity of alternative retirement vehicles. These vehicles, introduced by the Finance Act 1999, permit greater flexibility of investment and income management (Irish Department of Social and Family Affairs, 2007). Immediate annuities are a relatively small part of the post-retirement market, with roughly 3 in 10 retirees electing to purchase an immediate annuity and deferred annuities are almost non-existent in Ireland (Indecon & Lifestrategies, 2007).

Markets in other countries are small, but are also dominated by immediate annuities. **Australia** has a relatively small market for immediate annuities, despite the excellent foundation laid by the mandatory superannuation system (Cardinale *et al*, 2002; Brunner, 2008). **New Zealand** also has a very small annuity market, though, in contrast to its counterpart across the Tasman Sea, this is primarily due to the very low levels of private pension saving resulting from the comprehensive social security and absence of tax incentives.

This discussion would also not be complete without acknowledging a new entrant to the group of countries with strong and vibrant immediate annuity markets. The **Chilean** reform has produced not only a significant build-up of assets in the accumulation phase but may now fairly be described as having spawned one of the most sophisticated markets for both immediate and deferred annuity markets in the world. The strong product variety, within the limits established by prudent policymakers, and the vibrant competition illustrated in significant supplier numbers and the evidence

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Premiums for individual annuities in the United States totaled approximately 1.2 percent of GDP (Mackenzie, 2006), which appears to compare very well with the corresponding proportions for South Africa and the United Kingdom of 1.2 percent and 0.8 percent (Rusconi, 2006a). However, the latter figures apply to immediate annuity purchases, in other words conversion of accumulated savings to income at retirement, after withdrawal of any lump sum amounts, while the figures for the United States refer to savings contributions and cannot reasonably be compared with the others.

<sup>11</sup> Impaired life annuities are sold on more generous terms to applicants with a lower expectation of life.

<sup>12</sup> Rusconi (2006a) describes the South African market as larger, relative to the economy, than the corresponding market in the United Kingdom, as illustrated by the figures in the earlier footnote.

of sophisticated risk rating patterns (Rocha & Thorburn, 2006) all bode well for the group of reformed countries with rapidly growing prospects for annuities in the near future.<sup>13</sup>

### ***Guaranteed deferred annuity market type***

The second broad market grouping consists of countries also with a strong history of annuity provision, but in a rather different type of vehicle, the guaranteed deferred annuity.

**Denmark** has a well-established and strong market for deferred annuities. This market is supported by the existence of foundational but not particularly generous social security arrangements and by a long history of occupational pension plans, in which defined contribution types now largely dominate its defined benefit alternative as even plans covering public sector employees are being switched across from the former to the latter (Council for the European Union, 2003).

Occupational arrangements reach some 95 per cent of the labour force (OECD, 2007a) and provide the primary source of members of annuity products. Members may choose from three different forms of payout at retirement, a lump sum, an instalment payout over a fixed term,<sup>14</sup> and an annuity for life or for a fixed term, but they must exercise this choice at the time of contributing, on average many years before the date of receipt.<sup>15</sup> Annuities predominate over the alternatives among members of occupational arrangements. Supplementary retirement saving adds further impetus to this process, though in this case, lump sum payout forms are more popular than the annuities.

The products offer minimum guaranteed investment returns that cover both the accumulation and payout phases, including the considerable mortality risk over a very long period. These returns are then supplemented by bonuses that arise from performance that is in excess of the relatively low guaranteed levels, both during the accumulation and payout phases, after allowing for mortality gains or shortfalls to the provider. This approach strongly contrasts the corresponding design in the immediate market types described earlier that separate the accumulation from the payout phase and set out terms for the immediately annuity that are fixed and guaranteed but only apply from the date of purchase of the annuity at retirement.

**Germany** provides another example of an annuity market dominated by the deferred annuity type. Most commonly, products are regular premium deferred annuities with a guaranteed revaluation rate at a relatively low level and profit-sharing between provider and customer via a system of bonuses, regulated in some detail by the supervisor (Cardinale *et al*, 2002).

The annuity market in Germany is relatively small, mainly because social security benefits have until now played a very significant part in the old age provision of its citizens. This is changing. Demographic pressures are prompting reforms to the national framework that reduce the effective benefits payable from the system and German policymakers have sought to encourage alternative forms of saving through a set of interventions, particularly the 2001 package of reforms and tax

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<sup>13</sup> Some of these markets are no longer particularly small. The reformed individual account system in Argentina, for example, has produced already some 300,000 annuitants.

<sup>14</sup> This payout period is limited by law to the interval 10 to 25 years and may not extend to beyond age 85 (Andersen & Skjodt, 2007).

<sup>15</sup> Participants are permitted also to mix their allocations, applying premiums to a combination of the three types. Lump sums and phased withdrawals can be converted to annuities at any time. The deferred annuity market is significantly supplemented by immediate annuities purchased because of this type of conversion.

provisions. The reforms are expected to increase the attractiveness of private sector saving vehicles and the corresponding attractiveness of annuitization, through the so-called 'Riester' provisions, though it may be too early to tell whether the attractiveness of tax incentives is exceeded by the relative inflexibility imposed by the policymakers to encourage income in retirement (Schnabel, 2002). An encouraging sign of growth is that the proportion of all insurance benefits paid out by insurers that take the form of annuity payments is increasing (Purcal, 2006). Innovation is evident as well. The 'Riester' products include programmed withdrawals in combination with deferred annuities starting at age 85 (OECD survey, 2008).

The German annuity market has the potential to become one of the largest in the world over the next one or two generations, as the shift from public- to private-sector provision runs its course.

**Belgium** is another country whose annuity market is negatively impacted by the existence of generous social security benefits. The country has a long history of occupational pension fund membership, but coverage is not as generous as in some of Belgium's counterparts with some 40 per cent of private-sector employees estimated to be saving for retirement through employment-based arrangements (Cardinale *et al*, 2002). Until recently, the development of the annuity market was hampered further by a tax system incentivising lump sums in preference to annuities, supported by the generous social security benefits that reduced the personal risk associated with such a strategy. This appears to be set for change through the 2003 *Vandenbroucke* law designed to encourage saving in defined contribution arrangements and increase the take-up of annuities (OECD, 2004), not least by taxing annuities in a way that is fair in comparison with lump sums.

Annuities in Belgium were dominated by deferred annuity types, but the guarantees implicit in these arrangements were gradually eroded until they came to provide for the lump sum at retirement, in any case a more popular vehicle, making no promises about the level of income receivable after retirement. The largest source of demand for annuities now, however, is from small and medium work-based pension arrangements that purchase annuities from life insurance companies because they are not in a position to bear the risk themselves. In contrast to some of the other countries in this group, then, single premium immediate annuities have become the norm (Cardinale *et al*, 2002). This may change again as the 2003 reforms grow in their impact.

**The Netherlands** provides an example of an environment with characteristics strongly reminiscent of its northern European guaranteed deferred annuity peers, but it also has a significant immediate annuity market. Social security benefits are almost universal, but established at a level that eliminates poverty rather than establishing comprehensive income protection for all residents (Council of the European Union, 2003). This leaves ample room for private sector saving, as demonstrated by the very high level of coverage in occupational arrangements, complemented by individual supplementary saving.

Together, however, the social security and occupational arrangements do not leave space for a very large annuity market. Cardinale *et al* (2002) estimate a total market size, in terms of single premiums, of just over EUR10 billion, but this is assumed to represent aggregate market scale rather than the annual volume of annuity purchases. This figure also represents a combination of group insurance contracts from occupational saving, mostly in the form of deferred annuities, and annuity purchase from individual supplementary saving plans, which are more commonly in the form of immediate annuities. In common with the other countries in this group, increases to annuities in payment are usually determined conservatively and enhanced by bonuses, though a higher rate is

sometimes guaranteed for an initial period. Escalating annuities with pre-defined rates of increase are not common (Cardinale *et al*, 2002).<sup>16</sup>

### ***Other annuity markets***

A number of countries fall outside of this imperfect model for describing annuity markets. Most of them have very small markets. Some of these are significant but difficult to categorise because of features that render them unique.

**Switzerland** provides an example of such a market. It is included in the grouping of ‘other’ markets because its operation is significantly affected by the imposition of fixed conversion factors at retirement for mandatory pension savings.<sup>17</sup>

The social security system provides nearly universal coverage, but it is highly redistributive and benefits are set at relatively modest levels.<sup>18</sup> This is supported by mandatory contributions to a well-established occupational system (Queisser & Vittas, 2000). Assets in Swiss pension funds, over 120% of GDP, place this country third in the world, but the system is the only one of these countries so dominated by the occupational environment (OECD, 2007b).<sup>19</sup> Insurer-provided products form a relatively small part of the system.

This supports a significant annuity market, as lump sums at retirement have until recently been permitted only for small amounts, or by special permission, which must usually be requested three years in advance of retirement.<sup>20</sup> Not all of the accumulated benefit must be taken in the form of an annuity, however, and things are changing. From 2005, all retirement arrangements have been required to offer to their members the option of taking up to 25 per cent of their retirement savings in the form of a lump sum. Many of them offer more than this, stimulated by the potential for financial loss to the product provider caused by the unusual pricing stipulation described below. Annuitization of the accumulation in supplementary saving vehicles, unaffected by the compulsory conversion rate and offering poorer value to customers consequently is less significant (Bütler & Ruesch, 2007).

Bütler & Ruesch (2007) refer to separate research (Bütler & Teppa, 2005) suggesting that roughly 80 per cent of retirement capital is taken in the form of annuities. Contrary to many other markets, this rate of annuitization is high, perhaps due to tradition and habit, but more probably because generous conversion rates in insurer-provided mandatory pensions compensate participants for the corresponding conservatism of returns during the accumulation phase. Growth in payments to annuity recipients has been rapid, from CHF10.75 billion (2.92 per cent of GDP) in 1994 to CHF18.13 billion (4.21 per cent of GDP) in 2002 (Bütler & Ruesch, 2007).

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<sup>16</sup> Escalating annuities pay income that increases over time, either with reference to a benchmark, in which case they are referred to as index-linked, or at a fixed nominal rate like 3 percent.

<sup>17</sup> Fixed conversion factors have the effect of converting immediate annuities into a type of deferred annuity because the terms of the annuity purchase are known in advance.

<sup>18</sup> Bütler & Ruesch (2007:abstract) describe Pillar I as “*a relatively small pay-as-you-go system*”

<sup>19</sup> The Netherlands and Iceland have larger occupational pension system, supplemented by pension insurance contracts and other types of arrangement. The Danish system has more assets, relative to GDP, than any other, but most of these are in pension insurance contracts, as described earlier in this paper. (OECD, 2007b)

<sup>20</sup> This is designed to help protect the occupational funds against adverse selection by annuitants (Bütler & Ruesch, 2007:16) by reducing the extent to which participants can make their choice based on knowledge of their health condition at the time of retirement.

All annuities in Switzerland are for life and provide contingent spouse and children's benefits at stipulated levels. All annuities are fixed in nominal terms, with increases granted by the retirement plan or insurer to the best of their financial ability. Unusually, insurer-provided annuities in the mandatory saving environment are not priced competitively; providers are required by law to use the same stipulated conversion factor for men and women and for both married and single annuitants. Occupational pension funds are provided some leeway to adjust this legal requirement to meet the constraints of their financial position, but insurers are not permitted this leeway in respect of mandatory saving (Bütler & Ruesch, 2007; Mackenzie, 2006).<sup>21</sup>

These conversion terms are not attractive to the insurers, but they are balanced by the relatively profitable terms under which they are able to provide products in the accumulation phase, since the guaranteed investment returns required of them are not onerous. This unusual system, balancing post-retirement risk with the more rewarding returns available in the accumulation phase, appears to run some risk, particularly as insurers and occupational pension funds take advantage of the opportunity to encourage members to take benefits in the form of lump sums in preference to annuities.<sup>22</sup>

The annuity market in **Singapore** also has a number of unusual features. Analysis is complicated somewhat by the recently announced policy changes that will stimulate a post-retirement environment tomorrow that looks quite different to the picture of today.

Despite the very significant accumulation of savings in the Central Provident Fund and the almost complete absence of alternatives forms of social security benefit (Asher, 2000; Doyle *et al*, 2001), the annuity market is small. The main reason for this is that the Central Provident Fund has not delivered the accumulation of pension provision that might have been hoped, because it has been used also to save for other purposes, notably housing. Another reason is that participants have enjoyed significant choice regarding their accumulated savings, allowed to withdraw all but a relatively modest minimum level and given substantial freedom regarding the treatment of this minimum.<sup>23</sup> Doyle *et al* (2001) report that in 1999 approximately one-sixth of retirees purchased annuities.<sup>24</sup>

Most annuities are paid for life, but all annuities are sold with a short period of deferral. They must be purchased at age 55 but start paying only at age 62, an unusual market feature that probably

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<sup>21</sup> Switzerland has a voluntary system, but it also permits complementary contributions to the second pillar, a type of supra-mandatory layer. Fixed conversion factors do not apply to these layers. Contributions to the mandatory pillar nevertheless dominate these alternatives, forcing insurers into fixed terms for annuities matching a substantial part of all accumulated saving.

<sup>22</sup> Authorities have recently announced a gradual reduction to conversion rates, an increase in the capital value per unit of annuity provided, but indications are that this concession is too little too late to make the annuity portion financially viable to insurers (Bütler & Ruesch, 2007, and direct correspondence with authors).

<sup>23</sup> *"At age 55, an account holder is required to set aside a specified minimum of the funds accumulated in his account (the Minimum Sum) to finance a basic level of income in retirement at age 62. (The rest may be withdrawn.) These funds may be used to purchase a deferred life annuity with payments to begin at age 62; withdrawn to make a deposit at a bank, or left with the CPF, where they would earn a minimum nominal rate of 4 percent. At retirement, funds left with the CPF or deposited with a bank are paid out monthly until the balance is exhausted. This choice means that, strictly speaking, Singaporeans are not obliged to annuitize any part of the balance of their account."* (Mackenzie, 2006:25)

<sup>24</sup> Mackenzie (2006) quotes the figures of Kristensen & Yew-Lee (2002), which note that around 23,000 annuity contracts had been issued by Singapore-based life insurers as of the year 2000, covering only 6 percent of the population aged 60 and older.

reduces the extent of adverse selection (refer to the analysis of the money's worth ratio in Singapore in annex 1).

The authorities have announced a number of changes to the system that will significantly change the operation of the post-retirement market. From 2013 when the first set of 55-year-olds will be affected by these changes, annuity purchase is to be compulsory for those participants attaining that age with an account balance of S\$40,000 or more. The retirement age is to be increased from 62 to 65, and later to 67. All participants required to take an annuity will purchase a term annuity starting on the retirement date together with a deferred annuity that commences at the end of the term annuity but pays out at the same level, an example of a product combination referred to by DAF/AS/WD(2008)4.<sup>25</sup>

Flexibility is limited, a sound approach considering the financial significance of the system to its participants, but sufficient to enable participants to strike a balance between the objectives of providing an income for themselves and leaving a bequest to dependents.

The **Mexican** annuity market is expected to grow rapidly as an increasing number of participants in the mandatory individual account system reach retirement. Like its Chilean counterpart, the Mexican system provides some choice of vehicle for the payout phase. It permits a withdrawal of a lump sum for sufficiently large balances and a choice of immediate annuity or programmed withdrawal otherwise.

All annuities are index-linked, payable for life and provide for a spouse's benefit on the death of the principal annuitant. Deferred annuities do not play a part in the Mexican market. What makes this market unusual is that pricing is imposed on the providers. Both the mortality basis and the interest rate are specified by the authorities, together with stipulated mark-ups to cover administration, acquisition costs and mortality contingency. This means that there is no competition on price, only on other product features, tightly constrained to increments on the basic pension and life insurance products for the pensioner or beneficiaries (IMF, 2007).

Lifelong annuities in **Sweden**, covering the payout phase of both the centrally-managed notional defined contribution system and its partially privatised financial defined contribution counterpart<sup>26</sup> are provided entirely by the state. Participants may select either this state-provided guaranteed annuity, which is priced at a fixed low discount rate but pays out bonuses if returns exceed this (Palmer, 2000) or a variable rate annuity, in which case the accumulation remains in unit-linked accounts and the investment and longevity risk remain with the participant.<sup>27</sup>

Other markets are smaller, most of the reformed markets emerging as members of the immediate annuity market type.

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<sup>25</sup> Participants are still required to make their election at age 55, setting aside at least a minimum sum of their retirement assets as they do so. Both parts of the annuity are thus deferred. (Refer to the description at the Singapore Ministry of Manpower web site, [http://www.mom.gov.sg/publish/momportal/en/general/National\\_Lifelong\\_Income\\_Scheme/LIFE-Quick\\_Guide.html](http://www.mom.gov.sg/publish/momportal/en/general/National_Lifelong_Income_Scheme/LIFE-Quick_Guide.html), downloaded on 9 April 2008.)

<sup>26</sup> Contributions are collected by a central agency, which also manages the individual records. Asset management is carried out by registered private asset managers selected by participants.

<sup>27</sup> Variable annuities have so far been much more popular. Some 85% of the 450,000 that had retired up to the end of 2007 have selected the variable rate option (Palmer, 2008).

- **Argentina** is well into the payout phase of its reform, with some 300,000 retirees having chosen between the available options of a programmed withdrawal or a lifetime annuity product (direct correspondence with supervisory authority).
- **Poland**, due to sell its first annuity products in 2009, planned also to permit greater flexibility in respect of voluntary saving than its compulsory counterpart (Góra & Rutkowski, 2000). The permissible product range has been under discussion for some time, despite the pressure to put into place regulations. An early draft of the provisions, for example, required providers to put into place four specified annuity types and required annuities to increase in payment at the rate of inflation (Chlon *et al*, 1999; Otto & Wisniewski, 2002). The final range of products remains uncertain at this stage, with a fifth round of draft legislation currently under consultation. Likely to be in place in time for the first retirees next year, all of them women who currently have an retirement date earlier than their male counterparts, is a compulsory programmed withdrawal to bridge the gap to the corresponding retirement age for men. Should this proposal be accepted, it would also provide a period of transition for system designers to put into place a coherent structure for post-retirement annuities and programmed withdrawal options. It remains likely that providers will be compelled to provide a set of specified products.
- **Hungary** requires annuitization for participants with a contribution history of more than 15 years up to a level of twice the minimum pension but imposes no restriction on the treatment of accumulated savings in voluntary accounts (OECD, 2002). The first annuitants in Hungary will reach retirement age in 2012.
- The policymakers in **Croatia** have chosen to differentiate between annuities purchased from the mandatory savings system and its voluntary counterpart, imposing tighter restrictions on the rules applying to the mandatory sector, on which it also provides guarantees (Anusic *et al*, 2003).
- Participants in **Estonia** can choose from a variety of annuity products, many of which appear to be sold as deferred annuities (Pirm, 2002).<sup>28</sup>
- **Colombia, El Salvador and Peru**, like Chile permit a combination of a deferred life annuity and programmed withdrawal, a combination that negotiates the balance between flexibility and security at the time of retirement. Details are available in DAF/AS/WD(2008)4. The document also cites El Salvador as an example of country in which an immediate annuity and a programmed withdrawal may operate concurrently, payments being received at the same time.<sup>29</sup>
- **Israel** has been providing index-linked annuities for some time, supported by a significant market for indexed government securities (Mackenzie, 2006). Annuities with payment growing at a fixed nominal rate are available as well. Both immediate and deferred annuities play a significant part in this market (OECD survey, 2008).

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<sup>28</sup> Estonia's response to the OECD survey (2008) suggests that this may have changed in the last few years, indicating that immediate annuities form the larger group at present.

<sup>29</sup> DAF/AS/WD(2008)4 sets out the theoretical combinations in some detail and supports this with examples of the different ways in which companies have put these options together. Its discussion is recommended to the interested reader.

- Markets in **France, Italy and Japan** are small, due mainly to relatively generous state pension systems and the complementary role played by occupational pension arrangements (Mackenzie, 2006).<sup>30</sup>

Nearly thirty countries are covered by this discussion. It aims not only to classify annuity markets but to illustrate the enormous variety that exists in practice. Figure 1 represents some of this diversity in diagrammatic form.

### *Determinants of annuity market size and type*

These short descriptions of annuity markets give a sense of the variety of features characterising national annuity systems around the world. It is clear that payout systems vary considerably in their characteristics. How do policymakers in countries with poorly developed payout markets determine the way forward, when the range of options is so great? Part of the approach is to recognise the influence of external factors, acknowledging that they may have a significant influence in the development of the annuity market.

Probably the most significant factors are the shape of the old age infrastructure and the incentives to purchase an annuity. These are discussed first.

- **The design of the social security system** exerts a strong influence on the need for annuity markets. Broadly speaking, the more comprehensive the benefits paid from the social security system, the less fertile the soil for private annuity products. This is not only because generous state benefits reduce the need to convert supplementary accumulated saving into reliable income, but because the cost of providing these benefits, in the form of social security taxes, may inhibit supplementary saving in the first place. Nevertheless, it is not sufficient merely to posit significant social security benefits as reducing private annuities. The socio-economic distribution of these benefits is important as well. A system of flat benefits, as in the Netherlands, for example, would leave open significant need for supplementary saving and annuitization among wealthier members of the working age population.
- Similarly, **the existence, design and intensity of mandatory saving systems** exert a strong influence on the development of annuities. Forced saving is likely to reduce the marginal propensity to make alternative provision, reducing the size of the annuity market. If, on the other hand, partial or complete annuitization of this mandatory accumulation is required, then this would of course stimulate the annuity market.<sup>31</sup>
- The **significance and design of occupational pension plans**, impacts the size and type of the corresponding annuity market. Whether these plans are dominated by defined benefit or defined contribution type strongly determines the pattern of development of the annuity market because the former often provide pensions from within the plan, while the latter

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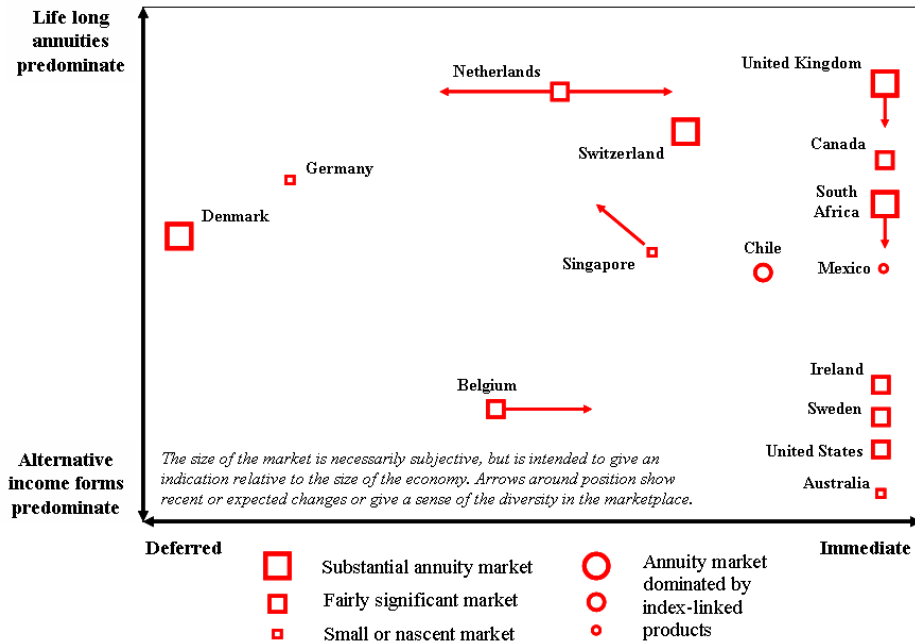
<sup>30</sup> Innovation nevertheless exists in these markets. Italian products include variable annuities that adjust to changes in longevity projections. The Japanese market includes immediate and deferred annuities and products are sold with a variety of guarantee options (OECD survey, 2008).

<sup>31</sup> “... annuity markets are larger, or growing at a faster pace, in those countries that have public pension systems with an important defined-contributions component and that encourage or require the annuitization of the funds accumulated in an individual account upon retirement.” (Mackenzie, 2006:27-28)



pays out to participants at the end of the accumulation phase a lump sum which they may then use to purchase an annuity.

**Figure 1. Schematic representation of selected annuity markets**



- **Tax incentives** have a strong impact on the potential development of annuities.<sup>32</sup> Tax incentives may influence the manner in which citizens save for retirement, to the extent that they have the marginal income, after social security taxes and mandatory contribution, to do so. The tax system almost certainly influences the choice of vehicles in the payout phase. Some countries, Belgium until recently, for example, purposely or inadvertently encouraged the withdrawal of benefits in the form of a lump sum because of the relative attractiveness of this option against its alternative, the annuity.

While these may be the four most significant drivers of annuity markets, others could be added.

- **The strength and stability of the regulatory and supervisory infrastructure** can be expected to exert an influence on the development of both the supply of and demand for annuities. A stronger structure is likely to improve the confidence of providers and consumers, as long as it does not impose undue constraints on product design or capital management, as noted immediately below.
- **Reserving requirements and investment regulations** would have an impact on the supply side of the market. Solvency rules that are too tight may improve the financial security of annuity products, but could also increase the price that suppliers require to participate in the market and may undermine product competitiveness as potential providers stay away.

<sup>32</sup>

Tax incentives may be the most prominent, but there are other policy forms that may strengthen or dampen the demand for annuities. Regulations in the United States impose a fiduciary risk on pension plan sponsors when selecting an annuity provider but not when failing to provide an annuity option to participants of the retirement plan (DAF/AS/PEN/WD(2008)3, citing Perun, 2004).

- **Pricing and product design freedom or limitations** would also affect the operation of the annuity market, dampening or encouraging both demand and supply.
- **The availability of technical information**, particularly concerning current and future mortality rates, would influence the ability of insurers to provide annuities, very long-term contracts, with confidence.
- **The level of public trust and confidence** in providers of annuity products, usually insurers that also sell other business or insurers that are specially registered to sell annuity products, would help to determine the level of demand.
- **The availability of appropriate investments** would help to establish competitively priced products and improve the perception of value.
- **Knowledgeable intermediaries** may facilitate the distribution of these products, as long as their reputation for sound, impartial and inexpensive advice were upheld.

Demand characteristics have a substantial impact on the development of annuity markets. **Consumer understanding**, for example, plays an important role<sup>33</sup> and **consumer access to health insurance** also impacts the demand for annuities as precautionary saving may be needed where health insurance or publicly provided health care are not reliable. Section VI sets out some of the reasons for the empirically poor demand for annuities in more detail.

Other economic and social characteristics such as a the level of household saving, general trends in economic performance, the tendency for individuals to look after their own finances and the attitude towards investment in stock markets could all exert a residual impact on the development of annuity markets. Finally, the history of retirement provision affects today's annuity patterns, building or undermining the supply-side infrastructure or demand-side confidence in the system.

### III. Product Design and Features

In this section, the variety of annuity products available across markets is considered. In contrast to the analysis above, this discussion is written by examining the main types of product feature in turn and describing the prevalence of each across markets. The discussion is limited to conventional annuities, or life annuities, under which payments are guaranteed to continue until death. Table 1 provides a broad assessment of the main broad product types from the perspective of a number of key characteristics.<sup>34</sup>

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<sup>33</sup> Better informed consumers may prefer annuities to alternatives because they understand the benefit that longevity insurance providers, but they may also display more confidence in their ability to obtain higher returns elsewhere, even at the risk of the longevity protection (DAF/AS/PEN/WD(2008)3).

<sup>34</sup> The ordering of these features follows broadly the lines of the OECD classification of annuity products.

**Table 1: A summary of annuity types**

	<b>Investment risk</b>	<b>Longevity risk</b>	<b>Death benefits</b>	<b>Increases in payment</b>
<b>Guaranteed deferred annuities</b>				
	Shared	Shared	Usually	Guarantee with bonuses
<b>Immediate annuity types</b>				
Fixed nominal	Provider*	Provider	Sometimes	None
Inflation linked	Provider	Provider	Sometimes	In line with inflation
With-profit or variable	Shared	Shared	Sometimes	Guarantee with bonuses
Market linked	Annuitant	Can be either	Sometimes	Dependent on performance
<b>Alternatives to lifelong annuities</b>				
Lump sum	Annuitant	Annuitant	Residual assets	Not applicable
Term annuity	Provider	Provider	None	Sometimes
Programmed withdrawal	Annuitant	Annuitant	Residual assets	Various models

Product variations are possible. This table should be regarded as providing only a broad summary.

\* While the provider must take on the risk of adverse returns, the annuitant is exposed to inflation risk.

### ***Timing of purchase***

As noted in the earlier section, many of the large annuity markets are dominated either by immediate annuity or deferred annuity types. Annuity products in the United Kingdom, United States, Canada, Switzerland, Ireland, South Africa, Australia and the newly reformed individual account countries like Chile, Mexico, Poland and Hungary and others are dominated by immediate single-premium products purchased at retirement with the proceeds of the accumulation of assets up to that time.

Participants in these countries, where safeguards have not been established by system designers, are exposed to a substantial risk at retirement, possibly the largest single risk faced in the lifetime of any individual with significant personal retirement savings, the risk associated with the timing of the purchase. This risk comes in three parts: the movements of investment markets up until the date of purchase, the level of interest rates – and therefore annuity rates – at the moment of purchase and changes in longevity expectations in the lead-up to purchase, also impacting annuity rates. Protection against these risks is usually enabled by the gradual transition of assets from equities into matching assets in preparation for the annuity transition.<sup>35</sup>

As individuals take on more of this type of risk because of the transfer from social security and defined benefit occupational systems to defined contribution or individual account alternatives, policymakers should seek to support efforts to educate them regarding the management of these

<sup>35</sup> The appropriate matching assets depend on the strategy on and around the date of the annuity purchase. Conventional bonds are the best vehicle to protect against the annuity rates applied to level annuities. Index-linked bonds are appropriate to hedge the risk involved in purchasing annuities that increase at the rate of inflation. Money market assets are the most appropriate for that portion of the accumulated assets that are to be taken in the form of cash. The situation is a little more complex if part or all of the assets are to be invested in a programmed withdrawal vehicle, but generally speaking, the best assets immediately before the transition are those that are to be utilized immediately afterwards.

risks.<sup>36</sup> Some systems explicitly protect participants against these risks, while others take concrete steps to guide them through the process in a way that at least manages the potential for financial loss. Switzerland provides an example of the first, with its mandated minimum returns in the accumulation phase and specified conversion rate at retirement (Bütler & Ruesch, 2007). Chile illustrates the second, with default investment strategies that change with the increasing age of the participant to balance the need for exposure to high-volatility high-return equities in the early years and protected asset classes in the run-up to retirement (SPFA, 2003).

Annuity products in Denmark, Belgium, Germany and, to an extent, the Netherlands, are mostly of the deferred annuity type, which is not to say that significant variations between these markets do not exist.<sup>37</sup> Deferred annuities provide a form of lifetime protection against both investment risk and longevity risk, the possibility of living a long time. Risk is not cost free and, though the financial institutions that manage these risks for their customers may be very well placed to do so, participants are likely to pay a premium for the benefit of this protection.

The Netherlands provides probably the best example of a market in which both immediate and deferred annuities prosper (Cardinale *et al*, 2002).<sup>38</sup> Participants in Singapore purchase what are technically deferred term annuities,<sup>39</sup> but based on a fixed, short period of deferment (Doyle *et al*, 2001).

### ***Payment increases***

The pattern of payment increases on an annuity goes a long way to determining its effectiveness as an income-providing vehicle in old age.

Deferred annuities, with the exception of the Singaporean example and the widespread use of shorter periods of deferment following annuity purchase at retirement, are generally provided on the basis of a guaranteed return plus a profit-sharing arrangement that increases the value of the accumulation in the period before retirement, or the annuity itself in the payment phase. The level of the guarantee is generally fairly low,<sup>40</sup> but the guarantee is generally not onerous to the supplier, leaving some room for profit-sharing. The level of the guarantee is usually the same before and after retirement.

The annuity itself may be calculated at a discount rate of zero, with the guarantee providing a minimum annual increase to the level of the annuity. Alternatively, the annuity could be structured as a level series of payments and calculated at the discount rate implied by the guarantee. This gives a

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<sup>36</sup> As discussed in other parts of the paper, this should be complemented by other actions that make it easier for consumers not only to manage their risks but to select the most appropriate product type and the cheapest available product to meet their needs. A centrally provided electronic quotation systems with supporting educational content, for example, would provide a valuable step in the right direction.

<sup>37</sup> Annuities in Luxembourg are also predominantly deferred and in Norway annuities are all of the deferred product type (OECD survey, 2008).

<sup>38</sup> According to survey respondents other markets with strong elements of both immediate and deferred annuities include Austria, Canada, Germany, Israel, Japan and Switzerland (OECD survey, 2008) though differences in the interpretation of terminology can be difficult to overcome.

<sup>39</sup> These are soon to be deferred life annuities.

<sup>40</sup> Periodic cuts to this guarantee level over the last twenty years in some of these countries suggests that the term 'low' is situation-dependent.

higher starting income, but increases are only paid when investment returns exceed the discount rate implicit to the calculation.

Immediate annuities, particularly in countries with well-developed annuity markets, are often available with a wide variety of payment profiles. Purchasers of annuities must assess the trade-off between the starting level of the annuity and its prospects for growth.<sup>41</sup>

Fixed annuities, paying a flat nominal amount for the lifetime of the annuitant, are popular, despite their inability to protect against the impacts of inflation over what is potentially a very long time. Some 86 per cent of lifelong annuities in Ireland are flat, guaranteed annuities, despite the availability of a range of alternatives (Indecon & Lifestrategies, 2007). Most than half of respondents to a survey by the Association of British Insurers (2005) reported that the annuity that they had bought provided no increases and a further 16 per cent could not recall the type of annuity purchased. Anecdotal evidence from South Africa echoes this tendency (author correspondence with insurers).

Commonly available in the well-established markets for immediate annuities are a variety of fixed-increment products, most often increasing at 3 per cent annually, some of them also at 5 per cent. Annuities that increase annually at the rate of increase of a standard price index are also available in these countries. In the United Kingdom and Ireland, these products are also available with the added condition that the annual increase is limited to some fixed value, usually 5 per cent.

In some markets, Chile and Mexico, for example, annuities are only possible in inflation-linked form.<sup>42</sup> Forcing inflation protection on providers and their customers is laudable in principle, but it requires recognition by the authorities that appropriate investment vehicles must be available if these products are to provide good value to their customers. Even in the presence of deep markets for inflation-linked assets, there may be investment-related reasons for poorer money's worth ratios than in their conventional counterparts.<sup>43</sup>

An analogue to the annuities in the deferred annuity markets that pay at a guaranteed rate and add bonuses is available in some of the immediate annuity markets. Frequently referred to as 'with-profit' or 'smoothed bonus' annuities, they are an extension of the product available in the accumulation phase that declares bonuses annually based on the performance of a pool of underlying assets.

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<sup>41</sup> Since the analysis involves a series of payments over an unknown period, this is a very difficult assessment to make, particularly given a tendency to use an inappropriately conservative mental discount rate and to over-emphasise the risk of early death. A wide range of products, without a set of tools to assist customers to make informed decisions, can lead to confusion at the time of purchase and inappropriate choices.

<sup>42</sup> Inflation-linked annuities are well established in Israel and the United Kingdom, are less popular in South Africa and exist, in low numbers, in the United States and other countries of Latin America (Mackenzie, 2006).

<sup>43</sup> Money's worth ratios are discussed in more detail further on in this paper. Simple conclusions should be resisted. Murthi *et al* (1999) find that money's worth ratios in the United Kingdom annuity market trail the corresponding ratios in the corresponding market for level annuities by some eight to ten percentage points. However, it is not clear whether the difference is due to adverse selection by customers or a shortage of assets that are both sufficiently reliable and provide returns about those available on government debt. While the excellent money's worth ratios in Chile (Rocha & Thorburn, 2006) are encouraging, this does not provide evidence that the entire difference between the corresponding figures in the United Kingdom (between level and index-linked annuities) is attributable to adverse selection, absent from the Chilean market (because all annuities are index-linked), rather than to other causes, like a deeper set of assets.

In their pre-retirement form, these products usually guarantee no more than zero, that is the return in any year will never be negative. As a with-profit annuity, referring only to the payout phase, some of these products are available at a customer-determined discount rate, up to some ceiling, together with a guarantee that the annuity will never fall. The discount rate is effectively a guaranteed return, which the insurer adds to with an additional bonus if the performance on the underlying assets, after smoothing, is deemed sufficient to permit this. This product are available in the United Kingdom and South Africa, though their popularity is dwindling in both countries, but notably absent from Ireland and the United States.<sup>44</sup>

### ***Death Benefit Guarantees***

One of the most common reasons given by consumers for not purchasing life annuities is that they perceive themselves as having incurred a loss should they die soon after purchase.<sup>45</sup> Most immediate annuity products around the world are available with some form of guarantee designed to provide a benefit in the event of early death.

The guarantee is most commonly expressed as a guaranteed number of years for which the annuity will be paid whether or not the principal annuitant survives the period. In the larger markets, there is considerable choice concerning the period, though 5 years and 10 years are the most common.<sup>46</sup> In some countries the length of the guarantee period is limited by policymakers. Canada, for example, limits the guarantee period to a maximum of 15 years. In Croatia, the guarantee period must be no shorter than 5 years; in Poland it must be no less than 10 years.

Guarantees take other forms as well. In Australia, annuities are available under which purchasers may opt for a capital sum, up to the amount of the purchase price of the annuity, paid to their estates (Purcal, 2006).<sup>47</sup>

### ***Dependents' Benefits***

The other common form of protection for dependents is the contingent spouse's benefit, payable to a surviving spouse in the event of the death of the principal annuitant. The spouse's benefit is often expressed as a percentage of the principal's benefit – or as a percentage reduction – and the level of the spouse's benefit is usually in the range of half to three-quarters of the principal annuity, but may occasionally be without any reduction on the annuity of the principal. A few examples of country-specific instances follow:

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<sup>44</sup> The market in South Africa for these products is sufficiently deep and sophisticated for insurers to offer to their customers a choice of discount rates, usually whole percentages up to around five, depending on the prospects for investment returns at the time. Some providers in the United Kingdom offer the same flexibility.

<sup>45</sup> At the heart of the problem is a misunderstanding of the essence of the life annuity as a contract providing insurance against the event of long life that shares the common pool of assets among those who have survived. While the bequest motive provides an apparently legitimate incentive to select alternatives in preference of annuities, research has shown that the bequest motive alone is not sufficient to explain the low global demand for life-long annuities.

<sup>46</sup> Annuitants in South Africa may select, from at least one provider, a guarantee period of any whole number of years, from 1 year to as long as 25 years.

<sup>47</sup> Similar products appear to be available in Luxembourg, Norway, Switzerland, the United Kingdom and the United States (OECD survey, 2008).

- The spouse's benefit in Canada is commonly set at a level that reduces by 30, 40 or 50 per cent, at the choice of the member on purchasing the annuity.
- All annuities in Mexico provide a separately calculated death benefit, though it is not clear whether what the IMF (2007) refers to as a 'survivor benefit' is a contingent spouse's pension in the meaning commonly used in other countries, or an alternative form of death benefit.
- In the Netherlands, anti-discrimination legislation ensures that the cost of contingent spouse's pensions are built in to the quoted price of all annuities, whether the annuitant is married at the time of purchase or not (Cardinale *et al*, 2002).
- Customers in South Africa may choose whether to add a contingent spouse's benefit. Some providers offer considerable choice on the level of this benefit.<sup>48</sup>
- Providers in Croatia must make available both single-life and joint-life annuities, with the spouse's benefit payable at half of the level of the pension on the death of the principal annuitant (Anusic *et al*, 2003). The same broad conditions are applied in Poland, where the level of payment to the spouse may differ (Góra & Rutkowski, 2000; Otto & Wisniewski, 2002), though final details may differ from those set out by these early writers.

No evidence of the existence of contingent benefits for surviving children in private sector annuity products has been found, despite the common existence of contingent children's benefits on the death before retirement of members of employment-based arrangements. Occupational pension plans in Switzerland are required to provide additional benefits to children at the time of the retirement of the participants, but these are not death benefits, they are an additional form of benefit payable to the dependents of members who have dependent children when they retires (Queisser & Vittas, 2000)

### ***Innovation***

A number of areas of product innovation have been identified, some of them in the design of the system itself and some in the creative approaches of product providers. These are discussed below, starting with policymaker initiatives. This section should be read together with the corresponding discussion in DAF/AS/WD(2008)4, particularly the consideration of alternative combination products.

As described earlier, participants in the Central Provident Fund (the CPF) in **Singapore** who purchase an annuity make their election at age 55 but only start receiving benefits from the fund at age 62. This compulsory deferment appears to reduce the effects of adverse selection.

Changes have been announced that will force all participants, with accrued saving exceeding a stipulated threshold, to purchase an annuity from the CPF on retirement. The period of deferment will increase, but participants will also be able to select from a range of options that allows them to balance the objectives of drawing an income and leaving a bequest to others. The accumulated retirement saving is split between a term annuity and a deferred annuity, calculated to pay out the same monthly income. The key is that, for a given level of retirement account at the time of the decision, a lower income preserves the value of the retirement account for longer, since it is the retirement account that

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<sup>48</sup> Again, it is not clear that customers are in a good position to choose between so many options. It is very difficult for the retiree to weigh up the relative benefits of a contingent pension paying, say, 70 percent of the original against 60 percent, taking into account the lower initial pension paid per unit of contribution.

funds the income during the period of the term annuity. And since the balance in the retirement account is paid to beneficiaries in the event of death prior to its exhaustion – which is when the deferred annuity starts – lower income leads to a higher bequest, all else being equal.

Participants thus choose from a limited range of options that permit each to determine their own balance between

- higher income, which has the effect of bringing forward the starting date of the deferred annuity, or
- a longer deferment, which reduces the cost of the deferred annuity, leaving more money in the retirement account and a higher payment to beneficiaries in the event of death before commencement of the annuity.

The **United Kingdom** also permits deferment of the annuity decision, in this case until age 75. Policymakers in that country have considered requests to remove or postpone this age of mandatory annuitization and appear set to leave it as it is. But steps have already been taken to improve the flexibility of annuity arrangements in the years prior to this age. Before the so-called A-Day of 6 April 2006, income during the drawdown phase had to fall in the range of 35 to 100 percent of the comparable annuity income. Changes implemented on that day removed the minimum and increased the maximum proportion to 120 per cent.

Tax changes have added to the flexibility in other ways. Providers can now offer value-protected annuities before age 75 that allow some money back on death (HM Treasury, 2006). They may also provide short-term annuities for a period of up to five years, permitting constructs that begin to look something like their counterparts in Singapore, though the period of deferment in the city state can be significantly longer.

Products in this market have continued to show innovation in other ways:

- Impaired life annuities for those in poor health continue to grow in popularity, as do variations like annuities paying out higher rates to customers with an established history of smoking.
- Investment-linked annuities are available that invest backing assets in an equity product, paying an annuity payment related to the performance of the underlying assets.
- Phased-retirement annuities, also known as staggered-vesting annuities, split the available assets into a number of segments, permitting a gradual withdrawal over a number of years

The TIAA-CREF<sup>49</sup> retirement arrangement in the **United States** has for decades shared investment and mortality risk with participants,<sup>50</sup> but began introducing further innovation into its annuity design from 1989. Rusconi (2006b:25), citing Ameriks (2002) and King (1996) summarises the three alternatives to the immediate annuity that are now available to members as follows:

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<sup>49</sup> TIAA-CREF is The Teachers Insurance & Annuity Association and College Retirement Equities Fund.

<sup>50</sup> Annuity rates are adjusted frequently to reflect changes to the current and projected mortality experience of this very large group.



- The Interest Payment Retirement Option pays to the member the interest credited to the traditional accumulation accounts, leaving the capital undisturbed. Members have been permitted to use this approach since 1989.
- The Minimum Distribution Option, available since 1991, pays income that is just sufficient to avoid the penalties that the authorities impose on individuals who do not use the assets of tax-assisted vehicle to provide an income in retirement.
- Systematic Withdrawals and Transfers, permitted since 1996, permit payment to the member according to their required schedule, for as long as assets are available to fund these payments. This is similar to some of the programmed withdrawal options available around the world, but without the constraints.

As reported by Ameriks (2002) members of TIAA-CREF retirement arrangements are switching in numbers to the more flexible post-retirement options to fit around their need for correspondingly flexible forms of income.

Further options are now available. Interest-only payments allow participants to withdraw only the interest that would usually be credited to the accumulation. The TIAA Traditional Account is a risk-sharing vehicle that guarantees principal and interest in return for the participant not withdrawing funds at once, but agreeing to series of scheduled withdrawals from the Transfer Payout Annuity.<sup>51</sup>

A **South African** insurer has modified significantly its with-profit annuity, a product that can be complex for the insurer to manage. The shareholders run significant risks in the portfolio blending the potential for poor investment returns and for longer-than-expected survival of the participating annuitants. Recent changes to international norms of risk management have sharpened the focus on these risks and the need to manage them proactively.

There are a number of aspects to the changes introduced by this insurer, but the most important of them is that bonuses are based almost completely on a formula approach, a weighted average of the performance of the underlying portfolio in that year and the previous five, with weights skewed towards the most recent year. From the point of view of the annuitant, the formula-driven approach is more transparent and produces results that are more predictable. It permits very little discretion on the part of the insurer and almost completely avoids the difficulties associated with the so-called funding level that exist in today's environment.<sup>52</sup>

The methodology behind this approach rests on a dynamic optimization between two broad types of portfolios, one that guarantees minimum returns and the other that seeks equity-type outperformance. The technique is commonly used by banks subject to risk-based regulation and capital management – which means that it has a well-established theoretical foundation – but is much less common among insurers. Though it has yet to be proven in the marketplace its apparent success at design level lies in its meeting the needs of both the insurer, for better risk management, and the customer, for greater transparency.

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<sup>51</sup> Information downloaded from the TIAA-CREF web site, [http://www.tiaa-cref.org/products/retirement/employer\\_sponsored/options/index.html](http://www.tiaa-cref.org/products/retirement/employer_sponsored/options/index.html), accessed on 20 March 2008.

<sup>52</sup> The funding level represents the mismatch between the assets backing the annuities and the liability to annuitants, in turn determined by the succession of historical bonus declarations.

Innovation continues to widen options in a number of countries. Some examples of these areas of innovation include:

- products aiming to improve overall return, like variable annuities with payments linked to the value of financial markets,
- product vehicles that tap into other forms of wealth like reverse mortgages that use the home of the annuitant as collateral backing the annuity income, and
- products that aim to meet specific risks, like those that meet the cost of long-term care covering the risk of health cost inflation.

Innovation often involves a combination of the features of lifelong annuities and alternatives like programmed withdrawals, as discussed in DAF/AS/WD(2008)4. These combinations may be thought of as falling into one of two broad categories:

- horizontal combinations that combine a term annuity, a programmed withdrawal or more flexible arrangement with a deferred annuity, an inexpensive form of longevity protection, and,
- vertical combinations that permit customers to combine approaches simultaneously, mixing the benefit of a guaranteed income with the flexibility of a programmed withdrawal, for example.

The OECD document entitled ‘Annuities and Financial Education’ argues that innovation should go much further before annuity markets can be described as complete, in other words offering to customers a product range that reasonably reflects the corresponding range of needs that these customers may have.<sup>53</sup> Providers and policymakers share the responsibility for developing innovative alternatives that are in the interests of customers and can be communicated with sufficient clarity for consumers to make sensible, rational choices, without being overwhelmed by the range of options available to them.

#### **IV. Pricing Characteristics**

An assessment of the operation of any market should include consideration of the way in which prices are set by suppliers and assessed by customers, together with the impacts that these dynamics have on the operation of the market. Prices are set by providers to cover the expected cost of the annuity together with sufficient margin to cover their risks, listed at the beginning of the section. In theory, consumers shop around to find the lowest price for their demographic combination and product needs. In practice, this does not appear to happen particularly well, at least in some markets, and this breakdown is evident in the pricing distribution. This section describes a common method for assessing the overall value for money provided by annuities, the money’s worth ratio, and considers the spread of prices evident from a number of markets.

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<sup>53</sup> The OECD document ‘Annuities and Financial Education’ discussion includes alternatives that provide features such as protected equity exposure, guaranteed minimum withdrawal benefits, structures that combine longevity insurance and long-term care insurance into a single product and one-time options to withdraw a part of the remaining capital value. Some of these combinations exist in some forms already.

### ***The money's worth ratio***

The most commonly used measure of the fairness of prices in an annuity market is known as the “money’s worth ratio”. The money’s worth ratio assesses the price of the product against a fairly-priced cost-free alternative.<sup>54</sup> The alternative is calculated as:

- the present value of the series of payments represented by the annuity contract, allowing for
- the time value of money, usually on a risk-free basis, and for
- the gradually reducing probability – since the likelihood of survival to each payment falls with the progress of time – that each payment will in fact be made.<sup>55</sup>

The approach provides a powerful, standardised method for assessing the level of annuity prices over time and across providers and customer types. It is nevertheless not perfect. Comparison across countries is rendered more difficult by, for example, the absence of an appropriate set of risk-free rate or higher return corporate bond alternative, the challenges of estimating mortality rates, particularly for the group of annuitants, and the difficulty obtaining actual purchase prices.<sup>56</sup> These issues are set out in more detail in annex 1, together with a description of some of the money’s worth studies carried out in a number of countries.

### ***Pricing spreads***

While the majority of studies show money’s worth ratios that, on average or for the highest available quotation, provide good value for money, a number of them also report high spreads between the best and worst prices for a particular customer.<sup>57</sup>

These spreads appear to persist over time in many markets. In others, however, there is encouraging evidence of change. Rocha & Thorburn (2006) show how the significant spread of money’s worth ratios in Chile has contracted over time, particularly after 1999. They suggest that this reflects a change in the behaviour of market participants in response to the legislative intervention, but especially in its impact at curbing inappropriate behaviour by intermediaries and forcing participants to use an electronic quotation system and select one of the best three quotes. Particularly pleasing is that the contraction of the range of prices appears to be most pronounced for lower premiums, where

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<sup>54</sup> Two other methods for assessing the value of annuities are noted. The internal rate of return calculation is “... *the discount rate at which the present discounted value of annuity payments will equal the cost of purchasing the policy*” (Mitchell *et al*, 1999:16) which is a little like considering the money’s worth from the other side. The insurance value of annuity contracts compares “... *the expected utility of purchasing an annuity with that from alternative, non-annuitized methods of decumulating assets during retirement*” (Mitchell *et al*, 1999:18, *emphasis in original*). Studies of the insurance value consistently show the substantial positive value provided by annuities in a utility-maximizing framework, leading in turn to the question of the low demand for annuities.

<sup>55</sup> A number of authors have set out the methodology behind the money’s worth ratio calculation more rigorously than this. Interested readers are referred to Mitchell *et al* (1999), Cannon & Tonks (2006) and Rocha & Thorburn (2006), for example.

<sup>56</sup> These are usually substituted with quoted annuity rates, an imperfect substitute that may improve the apparent money’s worth ratio.

<sup>57</sup> Researchers have noted this with consistency for the annuity markets of the United Kingdom and the United States. See, for example, Mitchell *et al* (1999) on the United States.

annuitants are more likely to be “... *without complementary sources of retirement income.*” (Rocha & Thorburn, 2006:169)

The authors of the Chilean study express concern that the range of prices, even after the contraction over the last few years, remains substantial, despite the quotation system that has all but ensured that pricing is effectively based on the best available rates.<sup>58</sup> It may be that providers are pricing on one or more rating factor not captured by the analysis carried out as part of the study.<sup>59</sup>

A brief analysis of pricing spreads in the United Kingdom, Canada and South Africa (see annex 2) shows that, at least for a part of the annuity markets in each of those countries, competition is strong and spreads reasonably low. This doesn't appear consistent with the significant spreads noted by a number of researchers of the UK and US markets, but data may be selective: perhaps only those providers competing most strongly make their prices available to public quotation systems. This may also reflect increasing price competition among a smaller pool of providers in mature markets.<sup>60</sup>

An analysis of pricing spreads across rating factors may shed some light on the strategies of providers, but this is confused by other factors, for example the mortality information available to them, the mix of the portfolio on books (both annuity and life insurance business), the expected performance of the assets underlying the portfolio, the financial position of the insurer and others. These problems are illustrated by the brief analysis described in annex 2, covering the markets of the United Kingdom, Canada and South Africa.

Markets vary. Some show smaller price ranges than others; some have a greater consistency of rankings across rating factors than others do. The maturity of markets may have much to do with this and the reliability of mortality data. There may be a number of reasons for these differences and, as Rocha & Thorburn (2006) demonstrate, these factors can only be teased out with detailed calculations and even then may not prove conclusive in their explanation of market dynamics.

Sustained large price ranges, particularly through time and across rating factors, should give policymakers considerable cause for concern regarding the sensitivity of customers to pricing differences, for they suggest that, despite the financial significance of the annuity decision, customers are not shopping around to find the best deal. Perhaps supervisors could start by gathering information regarding the price at which annuities are actually purchased, because without such information,

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<sup>58</sup> “... *a closer inspection of the sample revealed several cases where the annuitants' age, gender, premium, and terms of the annuity purchased were similar but MWRs [money's worth ratios] were different. [There] ... is separate evidence that the new quotation system has enhanced the transparency of the Chilean annuities market ... The systematic computation of MWRs would provide further evidence as to whether the new quotation system is indeed eliminating market inefficiencies and reducing differences that cannot be explained by individual risk characteristics.*” (Rocha & Thorburn, 2006:171)

<sup>59</sup> Brown & McDaid (2003) provide a useful summary of the range of factors that affect post-retirement mortality. It should be added that there is a big difference between understanding that a certain risk factor affects mortality and using it to price long-term guaranteed products in a world of increasing longevity, which requires reliable data, reasonable confidence and a certain degree of courage.

<sup>60</sup> Comparison with the corresponding research for Chile (Rocha & Thorburn, 2006) would be useful, but difficult to carry out. Rocha & Thorburn use actual purchase prices, not quoted rates, and they carry out detailed analysis of money's worth ratios. They also cover every annuity contract entered into so have better coverage of the market and may appear to find evidence of high dispersion as a result.

market dynamics cannot properly be understood, and without this understanding informed regulatory intervention is difficult.

### ***Summary of money's worth and pricing considerations***

In sum, the money's worth ratio analysis suggests that the value for money provided by annuity products is generally good, over time and across countries, particularly if considered

- against a risk-free benchmark, and
- from the perspective of the population as a whole.

Most annuity customers, however, do not see the problem against the risk-free benchmark.<sup>61</sup> This suggests that considering high money's worth ratio results as adequate evidence that annuities provide sound value may be a little misleading.

- Over certain historical periods and in some countries, money's worth ratios have been significantly lower. Examples include the United States in years past (Mitchell *et al*, 1999) and at present in two very different annuity environments, the thin market in Australia (Ganegoda, 2007), in which poor value might seem more logical, and the substantial market in the United Kingdom (Martin & FitzGerald, 2006), where the results are rather more puzzling.
- Money's worth ratios are significantly less attractive against the diversified portfolio of assets that may be appropriate for younger retirees than risk-free government bonds or their corporate alternatives. Orszag (2000) suggests that at age 60, a little over half of an individual's assets should be in equities. James and Song (2001) equate a 1 percent change in money's worth ratio to a fall in the effective annual return of 0.12 percent, suggesting that, were the benchmark assets to return one percentage point more, this could only be compensated by a corresponding increase in the money's worth ratio of some 8 percent.<sup>62</sup>

How does this square up against the apparently high insurance value provided by annuities? The problem is considered in the sections that follow, but is perhaps best described in terms of the difference in perception of the supply and demand sides of the market.

- Suppliers appear to be competing well and providing broadly good value, at least in terms of the asset mix that they need to hold to meet the guarantees that they provide, and allowing for the adverse selection effects that they must absorb. This needs to be qualified by the observation that competitive dynamics between suppliers could be improved to push down the pricing spread.
- The demand side of the market does not perceive this value because annuities do not provide the flexibility required at a retirement age that, by present demographic standards,

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<sup>61</sup> Furthermore, not all researchers agree with the position that value provided is "generally good", hinting at the unavoidable subjectivity of the conclusion despite the apparent science in the analysis. Refer, for example, to the discussion in the OECD document 'Annuities and Financial Education'.

<sup>62</sup> Viceira (2007) considers the case for life-cycle funds that invest assets appropriately to the expectation of life, rather than with a planning horizon of the retirement date. He provides examples of the suggested asset allocations of two such products.

is relatively low, and do not provide the access to an asset mix more appropriate to customers of this age and life expectancy. Even so, customers do not appear to make sufficient effort to find the best terms for their annuity.

All of this creates the impression of annuity markets around the world hanging in a somewhat tenuous balance. The discussion of the next two sections tackles each side of the market in turn.

## V. Supply Dynamics

Suppliers of lifelong annuities in many countries describe these as low-margin products. This is difficult to confirm because the uncertainty associated with annuities plays out over a very long period of time, so risk margins may be relatively high and profit uncertain. Stewart (2007), among others, points out that suppliers are subject to a number of risks, namely credit risk, liquidity risk, business risk, investment risk and longevity risks, all of which make it more difficult to provide annuities securely. Some of these problems can be rather intractable. Complete immunization of investment risk, for example, is rarely possible because government debt is not issued with a sufficiently long term. In some countries, Australia for example, governments are running budget surpluses, reducing the supply of debt.<sup>63</sup> Longevity risk is even more difficult to protect against, not least because reinsurance is often difficult to obtain at reasonable cost (Purcal, 2006). Policymakers in a number of countries are exploring the possibility of government-issue longevity bonds, though treasury departments are seldom enthusiastic to take transfer of this risk.

The issue of longevity risk is particularly challenging in voluntary annuity markets because individuals use information known only to them when deciding whether to purchase an annuity and which type of product to use to meet their longevity risk. Personal knowledge of health and longevity prospects leads those with the expectation of longer life to purchase an annuity, both because they have greater need for longevity protection and because they find the terms offered by the provider more attractive, a feature known as adverse selection. This leads the supplier to worsen the terms that it is prepared to offer, in turn making the product even more unattractive to those with poorer longevity potential. The impact of adverse selection is measurable in the difference between the mortality experience of annuitants and the corresponding experience of the population on average, but the former can be difficult to estimate and suffers the problem of circularity, as the best estimate of annuitant mortality is often obtainable from the assumptions made by suppliers.

This section asks a number of questions of the supply side. Concentration of suppliers is explored, contrasting the apparently increasing levels of concentration in the mature United Kingdom market with the more competitive environments characterising other markets and asking why this might be the case.

The link between pricing dynamics and the supply of products is considered. A number of issues for policymakers keen to support greater involvement by the supply side are considered.

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<sup>63</sup> Currency swaps with markets that do have long-dated debt are often cited as the solution to this problem, but risk is not cost-free. *“While insurers may be able to access long-dated bonds in other countries for their liabilities, the long term nature of the instruments then introduces expensive long currency swaps. A well functioning domestic market for long bonds is clearly preferable. (Purcal, 2006:5)*

### *Supplier Concentration*

A number of annuity markets are characterised by relatively high levels of supplier concentration. The annuity market in the **United Kingdom** has for some time been characterised by falling provider numbers.

- Some one hundred annuity providers were active around 1970. The current number of providers is reported by Cannon & Tonks (2006) at closer to 20 and some of these are specialist annuity providers. The money's worth ratio analysis of Martin & FitzGerald (2006) identifies nine providers of lifelong annuities at standard rates. The same number has been obtained from Annuity Direct<sup>64</sup> by this author for purposes of examining pricing spreads, but only a few of these appear to be pricing competitively (see Annex 2), a view supported by Purcal (2006).<sup>65</sup> Barriers to entry do not appear to be high – Cannon & Tonks (2006) report two recent new entrants to the market and others have recently announced their arrival – but this fall-off in the number of providers is surely not a good sign of a competitive market.
- Market domination can lead to monopolistic pricing practices. One provider now has 40 percent of the market and some 57 percent of new premium income. Scale does not appear to play a substantial part in the competitive pricing dynamics, since immediate annuities involve large sums of money compared with other financial products so the administration loading is relatively small (Cannon & Tonks, 2006). Pricing power, however, is not just about scale but also about risk. Having a significant book of business considerably improves the confidence with which an insurer is able to set prices. The dominant provider in the United Kingdom (provider 7 in charts 1 to 4 of annex 2) appears to be pricing confidently but not (apparently) seeking to squeeze out competitors with the cheapest products. However, it is not possible from the available information to characterise this pricing as either reflecting lower risk margins or seeking to take advantage of market dominance.
- Cannon & Tonks (2006) suggest that the money's worth ratio figures show no evidence of anti-competitive behaviour,<sup>66</sup> but the rapid fall in the corresponding ratios reported by Martin and FitzGerald (2006) are more concerning of a possible change in market dynamics.

Other countries characterised by established immediate annuity markets show varying levels of concentration. None of them show signs of losing suppliers the way the United Kingdom is, but equally none of them appear to be attracting new providers in great numbers.

- In **Australia**, Cardinale *et al* (2002) note that the largest three providers of allocated annuities have market shares of, respectively, 20 percent, 18 percent and 13 percent. They point out that concentration is higher in the area of immediate annuities, with a Herfindahl

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<sup>64</sup> The data was obtained from [www.annuitydirect.co.uk](http://www.annuitydirect.co.uk) on 14 March 2008. As disclosed by the web site the quotes were last updated on 12 March.

<sup>65</sup> “Lots of UK life insurance companies offer annuities, but probably only five are felt to be serious players with good value products.” (Purcal, 2006:24)

<sup>66</sup> “... given this high degree of market concentration, it is perhaps surprising that the money's worth calculations in Chapter 3 suggested no evidence of monopoly profits in the voluntary annuities market.” (Cannon & Tonks, 2006:112)

index of concentration of 1,400, than in the corresponding market for allocated annuities where the corresponding index measure is 1,026. This should perhaps not be surprising given that the immediate annuity market is much smaller. More recent anecdotal evidence cited by Purcal (2006) suggests that there are only four insurers issuing life annuities and only three of these write any index-linked annuity business.

- **Canada** has a fair number of providers servicing a medium-sized market. CANNEX<sup>67</sup> provides comparative information across ten providers, but others are active in the market, as evidenced by eight additional insurers registered to sell annuity products to the registered pension saving market in the province of New Brunswick alone.
- Eight insurers are present in the annuities market in **Ireland**, but it appears that only seven of them actively write annuity business (Indecon & Lifestrategies, 2007). This is not a bad number of providers for a small annuity market.
- The **South African** annuity market is strongly dominated by five insurers, who appear to compete strongly on price. Smaller players seek to offer specialised products, but with limited success.
- Concentration of annuity providers in mixed market of **the Netherlands** is relatively high. Pricing is competitive and margins low. Some large insurance companies have elected not to participate in the annuity market at all (Cardinale et al, 2002).

The deferred annuity markets in Europe do not appear to be affected by high levels of concentration.

- Concentration in **Belgium** is not high, though the sale of new annuities is dwarfed by the volume of existing annuities on books.
- The **Danish** market is decentralized in the sense that it sustains a large number of providers but, until recently it has nevertheless been strongly dominated by just a few players. Andersen & Skjodt (2007) report an improving picture, with the market share of the largest five providers having fallen between 1995 and 2004 from 70 percent to 55 percent and the Herfindahl index from 1,267 to 854 over the same period.
- In **Germany**, the market concentration of insurers in general is somewhat lower than in other parts of Europe, France and the United Kingdom, for example, but annuities still make up a relatively small proportion of total insurer premiums (Cardinale *et al*, 2002).

There are a number of possible reasons for the lower levels of concentration in these markets. New business levels relative to the size of the existing book in these countries is not cumbersome. Risks are spread over a longer period and shared, through the system of bonuses, with customers, and the period often spans both the working and retirement years, the accumulation and the payout, allowing considerable diversification of risk for insurers.

The newly reformed markets appear to be attracting significant attention from providers of annuity products, perhaps reflecting high levels of competition to gain market share, establishing

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<sup>67</sup> Comparative prices are available at [www.cannex.com](http://www.cannex.com) at low charge.



brand-level awareness in the minds of customers,<sup>68</sup> acquiring the all-important intellectual advantage concerning mortality rates and perhaps seeking to attract certain types of customers in preference to others.

- **Chile** has 32 registered life insurance companies, of which 17 provide annuities (Rocha & Thorburn, 2006), in contrast to the six surviving registered providers of accumulation products. As discussed earlier, this market shows healthy signs of competition.
- Thirteen insurance companies were licensed to provide annuity products in **Mexico** in 1997 and 11 of these were active at the end of 2005. This contrasts the growth in the number of providers of accumulation products, from 13 in 2004 to 18 in 2005 and more since then. The market shares of the largest annuity providers in 2005 were, in respectively, 19.7 percent, 17.0 percent and 15.6 percent and the largest five have a share of 71.8%, a dominant position. The Mexican market is very small, however, and concentration levels may reduce with its development.
- Similar dynamics exist in **Argentina**, where the number of insurers licensed to provide annuity products is approximately double the corresponding number of registered pension providers (personal correspondence with member of the regulatory team).

No information is readily available on provider concentration in **Singapore**, but this market can in any case be expected to change significantly. As the responsibility for providing newly mandatory annuities shifts to the Central Provident Fund the scope for private-sector provision can be expected to reduce significantly, even though opt-out to private alternatives is permitted.

### *Comments*

A number of factors may play a role in explaining supply-side willingness, or unwillingness, to participate in the annuity market:

The natural progress of market maturity may result in gradual domination by a small number of stronger providers. Whether this can be said to apply in the United Kingdom or the Netherlands is not clear. Though the number of providers appears to be stable or falling – providers are staying away in both cases – the markets appear to be still expanding. Nevertheless, the interest in these markets is less intense than in the rapidly expanding alternatives elsewhere.

Longevity risks may play a strong part in the thinking of potential suppliers.<sup>69</sup> This was the concern most frequently cited by policymakers as a deterrent to supply-side market entry, along with the lack of financial instruments to hedge against longevity risk (OECD survey, 2008). Since a weak annuity market could be regarded as a national problem, governments may give serious thought to providing longevity bonds, but this does not yet appear to be a strong possibility (Antolín and Bloomstein, 2007).<sup>70</sup>

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<sup>68</sup> This should be less important in countries with automatic quotation systems, like Chile.

<sup>69</sup> Unexpectedly long average life spans have been a problem across the world recently, even in the countries expected to show more stable patterns of development thanks to a better history of medical care and higher quality of historical data.

<sup>70</sup> Private sector alternatives appear to be gaining some traction in the United Kingdom.

Markets that permit providers to diversify risk across the accumulation and payout phases appear to have a better chance of attracting these suppliers, but this is a complex multi-faceted problem.

- The guaranteed deferred annuities in northern Europe and the lifetime arrangement in Switzerland have established long-term relationships that share risks between customer and supplier, though they may be described by some as sharing these risks opaquely, since it is difficult to tell exactly how much of the investment performance of the supplier is shared with its customers.
- The immediate annuity markets have an explicit break between accumulation and payout. Customers are encouraged to shop around for the best terms for converting capital to income at the date of retirement, through the quotation system in Chile or the open market option in the United Kingdom, but this separation may be part of the problem on the supplier side because it reduces the potential for diversification of costs and risks.
- This may be exacerbated by the decision in some of the reforming countries to insist that annuity providers are separately registered. This may strengthen the prudential aspect of the regulatory structure but undermine the competitive dynamics because it could discourage new entrants.
- Life time strategies are emerging, particularly in the United States where the retirement construct is more flexible than in other countries, but these often leave risks – investment and longevity – with the customer and fail to provide a complete solution.

Finally, regulatory requirements play a part in determining the attractiveness of a market to suppliers. Attracting sufficient suppliers to a risky market requires attention to the balance between the solvency of the suppliers and the risk retained by their customers.

It is tempting to suggest that a much wider range of products would solve the problem because it would allow customers to determine their attitude to risks and then find the cheapest product to meet their needs. Problems associated with too much choice and poor optimization decisions are well documented in the relatively simple accumulation phase (see Tapia and Yermo, 2007) or the trade-off between annuitization and programmed withdrawal. Allowing a complex combination of these could be detrimental to customer well-being. A well-communicated limited set of alternatives with the option for expansion in future may represent the best path for development.

Ultimately, the decisions on the balance of market risks rest with the policymakers in each country who must weigh up a range of issues, taking into account the financial significance of these strategies to their citizens and their ability to weigh up complex trade-offs.

## **VI. Demand Dynamics**

The discussion turns to the demand side of the market. That annuities are not popular is well-established, but there are a number of reasons for this that should be taken into account by policymakers seeking to design a national system that is in the best interests of all parties. The demand for flexibility appears to be one of the most important of these reasons, but simply improving the range of choices may not be the most appropriate response to this demand.<sup>71</sup>

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<sup>71</sup> Policymaker views on the most significant demand-side constraints are varied. Competition from more flexible alternative product forms at retirement is not frequently cited as a reason for poor

### ***Reasons for low annuitization***

It is well established theoretically that individuals should purchase lifetime annuities at some time towards the end of their lives. Yaari (1965) showed that, even with a motive to leave a bequest, at least some annuitization of accumulated assets is appropriate. Many have built on this work. Davidoff *et al* (2003), for example, showed that, under less stringent assumptions than those made by Yaari, the conclusion that some annuitization is an optimal strategy still holds. Nevertheless, the existence of a bequest motive is likely to reduce the extent to which a rational individual would wish to annuitize accumulated assets.

This is just one of the reasons proposed by researchers for low levels of annuitization. Some of the others described by Mackenzie (2006) are as follows.

- **Tax-favoured competing assets.** This covers not just alternative treatment of accumulated pension saving, where a lump sum might be more attractive than an annuity. Other saving vehicles may be more attractive, from a tax management perspective, perhaps even alternative asset types, like housing.
- **Public pension system.** As state pension benefits usually take the form of an indexed annuity for life, they system should be expected to crowd out private annuitization.
- **Occupational pension provision.** Mandatory or not, an employer-based pension plan would similarly reduce the demand for annuity vehicles, as long as the occupational arrangement pays a retirement benefit directly rather than requiring the participant to take accumulated saving at retirement and convert this to an income, as many defined contribution plans do.<sup>72</sup>
- **Lack of understanding.** Mackenzie suggests as well that poor understanding contributes significantly to the low take-up of annuities,<sup>73</sup> even the simple short-sightedness commonly documented in the accumulation phase. DAF/AS/PEN/WD(2008)3 points out that education and financial literacy should not be confused by researchers and policymakers, as they may have different impacts on the tendency to purchase annuities.<sup>74</sup>

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demand for annuities – this would only apply in those countries where alternatives are available – but the need for flexibility is alluded to in other ways. The most frequently cited reason for poor demand is personal circumstance, defined in the question as including family support, the need to cover the costs of medical care or insufficient assets to contemplate annuity purchase. A number of respondents cite the perception of unfair pricing and the motive to bequest assets to dependents on death (OECD survey, 2008).

<sup>72</sup> These three reasons for low annuitization are also the main motivations behind an expectation of higher demand for annuities in future. Changes to tax systems currently favouring lump sums over annuities and reductions to the level of provision sustained by state and occupational arrangements are expected to support the market for annuity products.

<sup>73</sup> “People may not be aware that the conditional rate of return to an annuity is significantly higher than the rate of return to more conventional fixed interest investments” (Mackenzie, 2006:40)

<sup>74</sup> “Brown, Casey and Mitchell (2008) find that more highly educated individuals are **less** likely to annuitize, but that conditional on education, more financial literate individuals are **more** likely to choose an annuity. ... as implicitly noted by Agney *et al* (2008), some types of financial education may simply serve to make investors over-confident in their investment skills, perhaps leading them to

- **Adverse selection.** This may play a part in reducing annuity demand, but other factors are likely to come first in explaining the behaviour.<sup>75</sup>

Vidal-Meliá & Lejárraga-García (2006) summarise the work of others that suggests that actuarially unfair pricing, insurance by the family and pricing that places annuities out of the reach of some potential purchasers could play a part, as well as the illusion of prosperity provided by the lump sum, which links back to the Mackenzie thesis of poor understanding. Fornero (2008) adds the possibilities of uninsured medical expenses and uncertainty about asset returns.<sup>76</sup> DAF/AS/PEN/WD(2008)3 demonstrates the influence of framing, default options and short sightedness.<sup>77</sup>

Nevertheless, the decision whether to annuitize is not straightforward. Furthermore, the balance of advantages and disadvantages changes over time. Milevsky (1998) argues that full annuitization should be postponed but points out as well that the optimal strategy also depends on the attitude of the individual to risk. Orszag (2000) supports Milevsky's view by determining an optimal investment strategy over a lifetime, not just until a retirement date, and showing that individuals ought to hold a higher level of equities than would be implied by annuitization at traditional retirement ages in the early or mid 60s.<sup>78</sup>

As set out earlier in this paper, pricing that is systematically unfair to the annuitant appears to be rare, at least among the better-established markets and averaged across the market, and the insurance value of annuities is undisputed. There may yet remain a gap between what insurers can safely offer and what customers really need – or think they need – that is not easily satisfied by lifelong annuities.

### *Consumer understanding*

If one of the reasons for the low take up of annuities is a poor understanding of the risks that they cover and the conditional returns that they provide, perhaps attention to this problem would improve the demand for annuities and hence the effectiveness of the markets. Evidence for this position is

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*believe that they can 'do better' than an annuity by investing on their own"* (DAF/AS/PEN/WD(2008)3:20, *emphasis in original*)

<sup>75</sup> Mackenzie explains well the uncertainty on the issue. *"In fact, it is very difficult to know what effect the mitigation or elimination of adverse selection would have on the size of annuity markets. The premiums paid by the longer lived would rise, since they would no longer be partly subsidized by the premiums paid by the shorter lived. This would tend to reduce the former group's demand. The premiums paid by other groups would decline. If they had participated little in the annuity market before, and the difference in life expectancy between them and the longer lived were sufficiently great, then their premiums might decline substantially."* (Mackenzie, 2006:41)

<sup>76</sup> Interested readers are referred, for more information on this analysis, to the additional references given by Fornero (2008): Bernheim (1991), Brown (2003), Turra & Mitchell (2004), Sinclair & Smetters (2004), Milevsky & Young (2002) and Gerrard et al (2006).

<sup>77</sup> DAF/AS/PEN/WD(2008)3 cites a number of studies that demonstrate a low level of basic financial literacy across a wide range of countries and expresses the view that the "understanding of issues pertinent to wealth decumulation, or the conversion of wealth into retirement income" is not likely to be better, *"and quite possibly worse"* (p 3).

<sup>78</sup> This "complete life time" approach, as opposed to the conventional wisdom of a two phase "accumulation and decumulation" strategy, is touched on in the description of annuity products and probably ought to feature more prominently in the thinking of both system and product designers.

mixed, both from the perspective of the current level of understanding and the impact that consumer education can have on behaviour.

Studies commissioned by the Association of British Insurers come to different conclusions regarding the level of understanding by prospective annuity purchasers.

- *The Pension Annuity Market: Consumer Perceptions* (2005b) raises considerable concerns both about the level of understanding of annuity products and the extent to which working age individuals close to retirement were planning for their post-retire years. This research is summarised by the authors of *The Pension Annuity Market: Developing a Middle Market* (2005a) as indicating a poor understanding of the pooling principles, the value of the life guarantee and the motivation for government-imposed compulsion in the United Kingdom.
- An alternative study, *Annuities: bonus or burden?* (2005c) concludes in contrast that a high proportion of recent annuity purchasers understood the nature of the life guarantee and the pooling principle underlying such an arrangement.

Consumers may rapidly improve their understanding as they go through the process of purchasing an annuity, but this could be too late, given the continuing low use of the Open Market Option in the United Kingdom,<sup>79</sup> and the increasing complexity of annuity options.

This somewhat murky picture is not helped by the broad consensus that financial education of consumers, while forming an almost mandatory part of the responsibility of the authorities, is not particularly effective at increasing the incidence of optimal outcomes.<sup>80</sup> This supports the mandatory use of national quotation systems, as in Chile, to select the best price, but doesn't necessarily address the issue of poor understanding of the nature of annuities, because this suggests that consumers are not well positioned to choose appropriately from a range of retirement options. Increasing complexity of retirement options is widespread,<sup>81</sup> good for the well-informed but not necessarily for the majority.

### ***The demand for flexibility***

Rusconi (2006b) considers the reasons cited by retirees for their observed unwillingness to commit significant financial resources at retirement to a lifetime annuity.<sup>82</sup> Consistently emerging from the studies considered is the desire for greater flexibility.

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<sup>79</sup> Providers of accumulation products must notify their customers well in advance that they are not required to accept the annuity offered by the same company. Consumers are encouraged to shop around for the best deal on their annuity purchase.

<sup>80</sup> Effective financial education takes place in a one-to-one situation, not broad-based information dissemination. One-to-one communication is provided by intermediaries, but it is difficult to ensure high quality, unbiased advice through this mechanism.

<sup>81</sup> Countries like the United Kingdom, Chile, South Africa and the newly announced system for Singapore provide examples. Many of the individual account reformers are already giving or are likely to provide at least some flexibility of options at retirement.

<sup>82</sup> Some studies suggest that it is not the significance of the financial commitment to the product that is the problem. In a survey commissioned by Gardner & Wadsworth (2004) in the United Kingdom, 58.8 percent of respondents said that they would prefer never to annuitize than to purchase an annuity at any age. Given the option to split their retirement capital, annuitizing just one half of it, 56.5 percent still did not wish to consider purchasing an annuity.

- A survey of more than 3,500 older workers in the United Kingdom (Gardner & Wadsworth, 2004) found that three quarters of respondents who selected against annuitization did so because they needed more flexibility than could be provided by the annuity.
- Analysis of the choices of retirees in the TIAA-CREF system (Ameriks, 2002) concludes that the move away from lifetime annuities coincides with an increasing need for a more flexible approach to the management of assets and income in the years around the retirement date.<sup>83</sup>
- Merrill Lynch surveys (2005 & 2006) in the United States show that the move away from a fixed retirement age has already largely taken place. A third of current retirees aged between 51 and 70 are working for pay.<sup>84</sup>

Authorities in many countries are responding to this demand for flexibility. Many of the individual account reforms include provision for choice between an annuity and a programmed withdrawal, in some cases with further variation permitted, for example in Chile. Some of the immediate annuity markets are permitting greater flexibility, for example the United Kingdom, though the rule forcing annuitization by age 75 remains.

Combination strategies are growing in prevalence. Some of these combinations are vertical, permitting simultaneous different treatment of parts of the retirement capital.<sup>85</sup> Some of them are horizontal, establishing combinations that work together over time, for example, the term annuity that combines with the lifetime annuity under the new dispensation in Singapore.<sup>86</sup>

In theory, any number of combinations could be permitted, and authorities might consider doing so. Three different forces are likely to constrain this increasing flexibility:

- Most tax authorities will continue to require that the retirement accumulation is used principally for post-retirement income purposes. This does not rule out programmed withdrawals or combinations but to the extent to which they are seen to provide loopholes to retirees, this development may be constrained.

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<sup>83</sup> “... it seems reasonable to conclude that many of these changes in the usage of TIAA-CREF income options may be related to the changing nature, rather than incidence, of retirement at many U.S. colleges and universities. In this new environment, participants’ need for income from retirement assets may no longer coincide with their decision to leave full-time work. In particular, participants may substitute income generated by part-time employment for income generated from accumulated retirement assets. This may be happening both formally, through specified phased retirement programs, and informally, as retirees choose to continue to engage in some form of employment during at least the first few years of their retirement.” (Ameriks, 2002:16)

<sup>84</sup> “The ideal retirement for 71% of adults surveyed is to work in some capacity, and almost half of those U.S. adults who plan to work in retirement (45%) say they don’t plan to stop working — ever. On average, people expect to retire at age 61, but they see themselves working an average of nine years in retirement. The average age at which they will stop working completely is over 70.” (Merrill Lynch, 2006:4)

<sup>85</sup> Consumers may split retirement capital into tranches and apply different strategies to each tranche in the UK.

<sup>86</sup> Refer to DAF/AS/WD(2008)4 for more detail on these options.

- Regulators generally seek to ensure that retirees are protected against the risks associated with their myopia, their tendency to withdraw early rather than plan for long-distant uncertainty. This also has the impact of constraining choice, limiting the freedom to withdraw large amounts and perhaps also constraining investment strategies.
- More generally policymakers may prefer to constrain the choice granted consumers because of the impacts that this choice may have on their decision-making. Longevity uncertainty enormously complicates the retirement decision. Together with the difficulty shown by consumers in making a rational decision in the face of a wide range of options (see, for example, Iyengar *et al.*, 2003), inappropriately wide choice may damage consumers' retirement security in the long run. Judging by the limits applied in most countries, policymakers do not wish to run this risk.

Another problem raised by a wider range of choices is the possibility of deepening adverse selection, as retirees correctly apply knowledge of their health and longevity prospects to the choice of product.<sup>87</sup>

This section is summarised in the points that follow.

- The demand for lifelong annuities, where choice is offered, has been shown to be consistently below the level postulated by theoretical considerations, even after controlling for a wide range of explanatory factors.
- One of the strongest empirical explanations for this is the increasing need for financial flexibility around the time of retirement.
- This could be addressed by improving the range of choices at retirement, but this in turn may compromise the objectives of policymakers and may bring its own range of difficulties to the retirement decision and the operation of the markets.

## VII. Concluding Comments

This paper aims to provide a sweeping summary of products and conditions characterising annuity markets around the world. It is almost impossibly short for the task that it has set itself, for what emerges is a remarkable diversity, of products – fundamental building blocks even – of supply side pricing and dynamics, and of customer choices and behaviour, not even touching on regulatory variations and their impacts. These closing comments are not intended as a summary of the issues touched upon, but a reminder of some of the most important insights gained.

Annuity markets are crucially important, for they play a substantial part in determining the well-being of their customers at a time in their lives when their human capital is behind them and income alternatives few. These markets will grow in importance as state-sponsored channels and defined benefit occupational plans reduce in significance and as increasing numbers of workers with individual account arrangements reach and pass their retirement age.

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<sup>87</sup> This appears to contradict the position of James & Vitas (2000) stating that self-selection of products narrows the adverse selection gap, but that analysis calculates the impact of adverse selection using money's worth ratios that assume the same mortality for annuitants as a whole. This is not likely in practice. Retirees selecting riskier product, that is those that on balance pay later like index-linked annuities rather than their flat nominal counterparts, are likely to be in better health and experience lower mortality than others, widening the adverse selection differential rather than narrowing it.

This paper and many others written on the subject are important. Insights that can be converted into improved policy are very relevant to market participants. But there do not appear to be many answers, certainly not a market model that may be described as ‘the best’ and applied to others. Apparently successful approaches – Denmark and Chile come to mind – are often quite different from one another, may not be easy to transfer to other countries and are, in any case, continually under development.

A number of interesting challenges or conundrums are apparent from the discussion in this paper and others. Just a few examples are set out below.

- How is it possible to bridge the gap between the rational annuity-purchasing approach, particularly in light of the clear insurance value of annuities and generally good money’s worth ratios, and the empirical evidence of the unpopularity of these products?
- How can the generally strong acceptance in guaranteed deferred annuity markets of the guarantee-plus-bonuses product model be explained in light of the waning customer interest in its with-profits counterpart, despite the creditable risk sharing concepts built into each?
- How might annuity products and their alternatives be designed to match better the logical transition from an equity-rich asset allocation to its more conservative alternative late in life, rather than introducing an awkward break point that tends to break this sensible conversion?
- In light of the important risk intermediation role played by insurers, how might regulators address the alarming trend of falling supplier numbers and market abstention by some prominent insurers in well-established yet growing markets like the United Kingdom and the Netherlands?
- What might explain the continued high price spreads in the deep market of the United Kingdom or parts of the sophisticated new market in Chile, and should policymakers aim to address dispersion like this?
- How do policymakers achieve the delicate regulatory balance between improving the security of provision, through techniques like prudential capital adequacy requirements, disclosure benchmarks and product standards, and encouraging providers to participate and innovate vigorously?

Most readers will have opinions on the answers to each of these questions, but the paper aims to demonstrate how difficult it might be to put together coherent responses that work, as expected, in a variety of circumstances. It urges policymakers not to oversimplify the issues that they face. Regulatory alternatives are not considered in any detail in this paper (Stewart, 2007, provides a discussion) and each of the questions above should trigger a succession of additional questions that need to be answered coherently for a market to work.

Some policy initiatives, however, may well be non-negotiable, or at least characterised by less intractable sets of trade-offs. Policymakers in each country, it is suggested, should consider the following thoughts with care:

- Develop or continue initiatives to improve customer understanding of one of the most difficult, more important decisions of their lives, through consumer education, watching the quality of advice and implementing standardised disclosure, as examples.



- Address distortions in supply-side competitiveness by emphasising price over its alternatives, perhaps through disclosure standards, open market options – which can take a number of different forms – or automatic quotation systems.
- Force a degree of product standardisation to facilitate price comparison and make some of the key alternatives more familiar to those approaching the annuity decision.
- Where innovation is appropriate, phase it in over time so that customers become familiar with each additional step in the process.
- Dismantle tax or other policy distortions that may promote behaviour that is not appropriate to the retiree.
- Strive for policy for the annuity market that is coherent with all other economic, social and political goals.
- Aim to keep the regulatory requirements appropriate to the risks that they are designed to address and to focus more attention on more significant risks.
- Ensure that product requirements are supported by the coherent development of appropriate investments, notably where index-linking of payments is encouraged or required.
- Study the market, its suppliers and its customers very carefully, aiming to understand its dynamics as clearly as possible, and doing so on an ongoing basis to understanding the impacts of any policy changes. There is simply no replacement for deeper understanding.<sup>88</sup>

Finally, policy initiatives concerning annuity markets must be developed within their broader social and policy context. The role that they need to play and the dynamics evident in them are strongly affected by that context.

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*“Understanding what drives the limited annuity market size is critical for evaluating whether policies to promote annuitization are desirable and, if so, which types of policies are likely to be most effective. For example, if research were to indicate that individuals have a strong latent demand for appropriately designed and priced annuity products, and that the small size of the market was due to supply constraints, then the appropriate focus of policy discussions might be to remove regulatory or other barriers to product innovation. Alternatively, if research suggests that the lack of demand for annuity products is perfectly rational because individuals are adequately protected from longevity risk due to formal and informal risk sharing mechanisms, then the appropriate policy response might be to do nothing. If, however, research suggests that the small market is driven by limited consumer demand, and that this limited demand is based on behavioural biases rather than fully rational reasons, the public policy may be most usefully focused on policies that educate consumers to overcome these biases (e.g., financial education programs), utilize behavioural biases to “guide” consumers into annuity products (e.g., the use of default options), or even force individuals to annuitize through compulsory programs.” (DAF/AS/PEN/WD(2008)3:9)*

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## ANNEX 1: MONEY'S WORTH RATIOS

This annex summarises the main findings of the money's worth ratio studies carried out across a number of countries. This is preceded by a discussion of some of the technical shortcomings of these studies:

- **An appropriate set of risk-free discount rates is not always available**, particularly at very long durations, and a flat yield curve beyond the longest available discount rate is usually assumed. The problem may be exacerbated in the case of the calculation of the money's worth ratio for index-linked annuities, where the index-linked bond market provides the corresponding term structure of discount rates.
- If researchers seek to assess the annuity against a **higher-return alternative**, they must use their judgment to determine what the alternative should be and how the discount rates should be calculated. Where this has been carried out, corporate bonds are usually the favoured asset class, but as term-dependent spreads for these securities over their government-issued counterparts are not easily determined, the usual practice is a constant spread layered on the term-dependent government bond rates.<sup>89</sup>
- **Best estimate mortality rates may be difficult to determine.** This is not so much a problem with the absence of data – the majority of countries have the relevant data available through national records, even by socio-economic class – but with apparent difficulties in accessing this data for pricing purposes. Uncertainty of annuitant mortality remains a widespread problem. This affects not only the annuity pricing itself but it can undermine the integrity of attempts to assess independently the fairness of that pricing, since a similar mortality basis may be used for pricing and for assessment. Ideally, the calculation should be carried out using mortality tables that represent the best estimate of the experience of the population and, separately, using the corresponding tables applicable

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<sup>89</sup>

The studies described in Mitchell *et al* (1999) and Rocha & Thorburn (2006) both use this approach.



to annuitants, because the impact of adverse selection by annuitants can be measured.<sup>90</sup> In practice, this can be difficult.<sup>91</sup>

- **Historical trends** in annuity pricing usefully demonstrate changes to the money's worth ratios, but can be particularly difficult to piece together. Appropriate discount rates may be difficult to determine in some countries; mortality tables are much more challenging to piece together. Even in the best-resourced environments, the United Kingdom for example, researchers tend to use the latest available mortality table for each year of analysis,<sup>92</sup> whereas providers are likely to have updated the latest official table to allow for improvements that have taken place since then.
- **Prices for annuities actually sold can be difficult to obtain.** Quoted rates are usually obtainable from a variety of sources, usually consumer periodicals in the country concerned, but obtaining information covering the annuity products actually sold is much more difficult. Rocha & Thorburn (2006) use actual annuity sales in their analysis of the Chilean market, thanks to the centralised quotation system and the high level of disclosure.<sup>93</sup>

These are technical difficulties. Probably the most significant problem is that the design of products in many countries does not lend itself to an analysis of money's worth ratios, which can only be applied to guaranteed annuities, those that promise a pattern of benefits in advance. The majority of products in the deferred annuity markets of northern Europe are provided on the basis of a guaranteed return combined with whatever bonuses the provider can afford.<sup>94</sup> Their counterparts in the immediate annuity markets similarly provide unpredictable returns. These products provide useful risk-sharing

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<sup>90</sup> Adverse selection is an important feature of annuity markets that ought to form part of policymaker considerations when designing or regulating such a market. *"The primary efficient-market requirement that is violated is commonality of information, that is, annuitants might know more about their life expectancy than the annuity issuer. In a voluntary market, this presumption leads to higher quotes on annuities than are actuarially fair for the population at large, and adverse selection sets in."* (Doyle & Piggott, 2002:20) Adverse selection can impact not only whether potential customers choose to purchase annuities or not, but also shapes the type of annuity preferred. Healthier applicants, for example, could better tolerate the income deferral characteristic of an inflation-linked annuity, potentially exacerbating adverse selection price impacts in that part of the market.

<sup>91</sup> An additional complication of the process is that mortality tables should reflect the expected future experience of the population being considered, which means making an appropriate allowance for expected improvements on the empirical data supporting existing mortality experience. Consistent underestimation of the year-to-year improvements in the mortality experience of a population as well-researched and demographically stable as the United Kingdom illustrates the potential for error in this respect.

<sup>92</sup> Cannon & Tonks (2004) use this approach and Martin & FitzGerald (2006) appear to use the same mortality table throughout their (fairly short) period of investigation.

<sup>93</sup> The author is not aware of any other studies that use the data of the actual annuity sales. Martin & FitzGerald (2006) use the details on the best annuity deal, for example, in their United Kingdom study. Rusconi (2006a) uses the average of the annuity quotations available from the largest providers in South Africa.

<sup>94</sup> *"Money's Worth Ratios are difficult to calculate in the Danish system because of the extensive reliance on bonus payments. An ex ante calculation would need to be based on assumed rates of future performance and bonus declaration, while an ex post calculation would require a considerable amount of data on actual bonus payments."* (Andersen & Skjodt, 2007:23)

mechanisms which are often in the interest of the customers, but these mechanisms make an analysis of the initial pricing very difficult.

The discussion below summarizes the main findings of a number of studies of the money's worth ratio provided by annuities. Readers should note that the results across countries are not directly comparable because they depend strongly on the assumptions used, notably for mortality, but to an extent also the discount rates. For this reason, numbers in the discussion below are stated broadly and a comparative table of results has not been provided.

Mitchell *et al* (1999) published their ground-breaking analysis of annuity prices in the **United States** in the late 1990s. They reported considerable dispersion of quoted annuity rates, a market feature noted by many successive researchers from different markets.<sup>95</sup> They calculated money's worth ratios lie mostly in the range of 0.80 to 0.85 assuming mortality rates of the general population and in the narrower range of 0.90 to 0.94 using annuitant mortality experience.<sup>96</sup> The impact of adverse selection appears to be between six and nine percentage points. The corresponding figures on corporate bonds yields are lower than these by between four and nine percentage points.

These figures are quite close to one, suggesting reasonable value for money for participants, though not as high as the corresponding figures from other countries. Furthermore, these results are some 13 percentage points better than the corresponding figures from the early 1980s, showing considerable improvement in money's worth ratios over that period.<sup>97</sup>

Mitchell and her colleagues also report on a set of calculations designed to illustrate the insurance value of annuities, comparing "... the expected *utility* of purchasing an annuity with that from alternative, nonannuit-ized methods of decumulating assets during retirement." (Mitchell *et al*, 1999:20, emphasis in original) Their results illustrate numerically the well-established case in favour of annuitization, by showing that, on an expected utility basis, "... consumers would be prepared to give up substantial fractions of their wealth in order to purchase actuarially fair annuities." (page 22)<sup>98</sup>

Murthi *et al* (1999) report on price analysis of the **United Kingdom** annuity market. They conclude that the financial cost of annuities is between approximately 10 and 12 percentage of the purchase price, equivalent to a money's worth ratio range of 0.88 to 0.90. They calculate an adverse

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<sup>95</sup> The authors of that paper investigated the possibility that annuity prices were related to the financial stability of the insurance companies or their size and could establish no reliable pattern on either of these.

<sup>96</sup> These are the figures expressed in the summary of findings in the paper. The range of outliers disclosed in the more detailed results is larger for the calculations based on population mortality than for the corresponding numbers in respect of annuitant mortality.

<sup>97</sup> The authors seek to explain this improvement in terms of the level of general interest rates, suggesting that lower rates of interest are conducive to keener pricing. "*When interest rates are low and stable, insurance companies may be able to price nonparticipating [fixed guaranteed] annuities more competitively with other fixed-income investments. In contrast, when interest rates are high and variable, insurance companies may be reluctant to assume that current yields will be maintained for the duration of annuities issued in that year, and therefore they act more conservatively and require larger contingency funds in their annuity pricing.*" (Mitchell *et al*, 1999:18) This does not appear to be supported by the recent experience in the United Kingdom, where money's worth ratios appear to have declined in the last few years, though other factors may also be at play in that case.

<sup>98</sup> Readers interested to consider literature documenting the theoretical case for annuities in the plans of retiring individuals are referred to Milevsky (1998), James & Vitas (2000) and Davidoff *et al* (2003).

selection impact of around seven percentage points. They also compute the corresponding figures for index-linked annuities and report them at between 8 and 10 percentage points more expensive than the corresponding annuities with payment profiles that were flat or increasing at a fixed nominal rate every year. A later study of the same year of experience (Finkelstein & Poterba, 2002) showed somewhat better results than these, with money's worth ratios closer to one.

James & Vitas (2000) report on a study across a number of countries, **Australia, Canada, Chile, Israel, Singapore, Switzerland** and the **United Kingdom**. They compute money's worth ratios, on the basis of a risk-free discount rate and annuitant mortality consistently above 0.96 and in some cases well over one.<sup>99</sup> Against population mortality, the corresponding ratios are at approximately 0.90, consistent with the figures of Murthi *et al* (1999), suggesting that the impact of adverse selection on annuity prices is approximate seven percentage points. Money's worth ratios for index-linked annuities are between seven and nine points poorer than for guaranteed level annuities and a similar difference is computed when allowing for corporate bond rates instead of the corresponding rates on government paper.

The authors of that paper suggest that money's worth ratios are generally better in countries with a steep term structure, because insurers are in a better position to earn returns that exceed the corresponding return on the risk-free asset. Another reason for high money's worth ratio is the structure of the annuity. In Switzerland, for example, where the annuity pays out on a guaranteed basis but adds performance-related bonuses, the high money's worth ratio in part reflects the investment risk shared by the annuitants with the providers.

Bütler & Ruesch (2007) confirm the generally very high ratios applicable to the Swiss market, pointing out that much of this is attributable to the mandatory conversion factors at retirement that are rather generous to retirees.<sup>100</sup>

James & Song (2001) build on the study of the previous year by James and Vitas, assessing the same countries, and confirm the earlier money's worth figure of nearly 1 on risk-free interest rates and population mortality. They compute the corresponding fall in this figure to allow for the higher discount rate implicit in corporate bonds at between 10 and 12 percentage points, a little higher than from the earlier studies. They demonstrate that the source of the strong money's worth ratios is the ability of insurers to gain returns that comfortably exceed those returns available on risk-free assets by diversifying across other asset classes.<sup>101</sup>

Knox (2001) reports money's worth ratios in **Australia** that are consistent with international norms, though he expresses reservation on the reliability of his figures, particularly in the area of mortality rates. His money's worth estimates for a 65-year-old male are 0.88 on population mortality and 0.99 on what is commonly regarded as a best estimate of annuitant mortality, a difference for adverse selection that is larger than in other markets. This result should not be surprising, since the

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<sup>99</sup> The calculated figures for a level annuity to a 65 year old male are, for Australia 98.6, for Canada 101.4, for the United Kingdom 96.6, for Switzerland 116.9 and for Singapore 125.6.

<sup>100</sup> They are not generous to all retirees to the same extent, however. Money's worth ratios for single males are significantly lower than for single females and their married male counterparts.

<sup>101</sup> Money's Worth Ratios close to one would not be possible without this investment performance because the impacts of adverse selection together with administration and distribution costs and risk margins can be expected to take at least ten percent from an otherwise fair price. The fact that these results are as close to one as they are suggests a positive contribution from the insurers as risk intermediaries and adds further to the puzzle that more people do not purchase life-long annuities.

impact of adverse selection ought to be greater where the proportion of the populating electing lifelong annuities is smaller, but the difference may also be attributable to uncertainty in the estimate of annuitant mortality.<sup>102</sup> As a very small proportion of retirees in Australia purchase lifelong annuities, however, it could be an accurate reflection of a large adverse selection effect.

Doyle *et al* (2001) compute figures for the same market that are somewhat lower than those of Knox, more consistent with those reported by Olivia Mitchell and her colleagues two years earlier. On annuitant mortality, money's worth ratios for men and women aged 60 or 65 at retirement vary from 0.88 to just over 0.90. The corresponding figures based on population mortality, like Mitchell's, fall into a larger range, from 0.80 to 0.87.

The same authors calculated money's worth ratios for the corresponding annuities in **Singapore**. They report results, on annuitant mortality, for males aged 62 (the standard retirement age) of approximately 0.93 and for females of 0.95. Figures are good, again consistent with or slightly higher than those from other countries. Perhaps more noteworthy from this study is the fact that the corresponding figures based on population mortality are very similar, slightly higher in fact in the case of women.

The Australian and Singaporean systems are very similar in the sense that the both mandate saving in individual accounts, but also very different contrasting the social security safety net in Australian with a virtual absence of similar last-resort protection in Singapore. Suzanne Doyle and her colleagues conclude that the existence of the adverse selection effect is linked with the provision of a social security safety net, for the absence of such protection renders the take-up of the annuity almost compulsory. The fact that all annuities in Singapore are deferred for seven years may further contribute to the low (or non-existent) adverse selection, since the period of deferment reduces the extent to which customers might take advantage of personal knowledge of their health risks and corresponding longevity prospects.

Cannon & Tonks (2006) report on an analysis of money's worth ratios in the voluntary-purchase **United Kingdom** annuity market from 1957 to 2002. The analysis is detailed complex, covering different types of annuities and a variety of mortality tables, but suggests overall stable average ratios of around 0.95 using population mortality and very close to 1.00 using annuity mortality, in both cases based on risk-free discount rates. The series of results over time show some volatility but also periods of apparent stability, notably the last few years of the study.

The same stability is not evident in the corresponding analysis, also of the **United Kingdom** market, reported by Martin & FitzGerald (2006).<sup>103</sup> This paper reports a dramatic fall in money's worth ratios between 2000 and 2006. The drop applies to all annuity types considered, including level, increasing at a fixed 5 per cent and increasing at the rate of inflation, though it is slightly more extreme for the annuities that promise an increase than for the level counterpart.<sup>104</sup> For level annuities,

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<sup>102</sup> Both of these are potential features of small annuity markets.

<sup>103</sup> The authors limit their attention to the compulsory purchase annuity market, which ought to provide better value for money than its voluntary counterpart because the scope for adverse selection is lower. They stress the importance of their analysis in the light of the recently introduced lighter set of restrictions on programmed withdrawals that would increase their attractiveness (refer to the discussion on programmed withdrawals in the United Kingdom set out in the previous section).

<sup>104</sup> The level annuity falls from around 1.10 in the year 2000 to just below 0.85 in 2006. The corresponding drop-off for the annuity escalating annually at 5 per cent is from 1.15 to less than 0.80 over the same period.

the presence of absence of a guaranteed minimum payment period does not appear to have any impact on the extent of the fall.

Martin & FitzGerald are not able to put forward a reliable reason for this precipitous fall. They considered the possibility that it reflected increasing conservatism regarding assumed longevity improvements,<sup>105</sup> but cannot find sufficient evidence that this may be the case. The suggestion by Mitchell *et al* (1999) that broad interest rates may be a strong determinant of value for money in annuities does not appear to hold true here. Annuity rates indeed climbed between 1996 and 2000 during a period of rapidly falling interest levels but the fall in these annuity rates from the year 2000 coincided with a long period of stable rates of interest.

Martin & Fitzgerald used the most competitive quoted annuity rate for the purposes of their analysis rather than the rates of annuities actually purchased or the average of the available rates. It is possible that, at the top of the money's worth series, competitive pressures led the best of rates inappropriately high and that a period of adjustment followed this effect, but more detailed analysis would be needed before firm conclusions on this could be drawn. The fall in equity values may have influenced annuity rates, but they did not recover with the market. Again, further research would be needed to explore this possibility.

Ganegoda (2007) also analyses the **Australian** experience. Her research indicates a significant fall in the money's worth ratios of annuities, for flat nominal annuities, to between 0.75 and 0.80, based on population mortality. She calculates money's worth ratios as low as 0.66 for males purchasing index-linked annuities. Adverse selection impacts appear to be smaller than those postulated for other studies, but the calculation can be expected to suffer difficulties determining the mortality rate appropriate for this small group of annuitants.

Rusconi (2006a) reports on a study of money's worth ratios in the **South African** life annuity market. Hampered by a shortage of reliable annuitant mortality data, he is able to conclude only that the value to customers, on average across products, appeared reasonably good.

The analysis of money's worth ratios in the rapidly maturing **Chilean** market by Rocha & Thorburn (2006) is probably the most comprehensive available study on the subject. This is not only because the study uses actual annuity prices rather than their quoted alternatives, but because it takes advantage of the detailed information available on each of these sales to assess the pricing across a number of explanatory factors. It is complemented by a similarly detailed econometric study of the determinants of annuity prices.

The authors of that study conclude that:

- Chilean annuitants have received good value for their premiums.<sup>106</sup> Using annuitant mortality rates and a risk-free discount rate, the average money's worth on actual annuity

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<sup>105</sup> The first few years of the decade saw increasing evidence of underestimation by actuaries of mortality improvements, particularly at older ages. Pension funds were particularly hard hit as this reassessment came together with significant falls in the values of their assets.

<sup>106</sup> The results concur broadly with those of James *et al* (2005) for the same country, though they are higher than James's for 2003. Rocha & Thorburn (2006:177) suggest that the reason for the difference lies mainly in the outdated mortality table used by James and her colleagues and possibly also in the smaller sample.

purchases in 1999, the first year of the study, was 0.98 and in every year thereafter comfortably exceeded one.<sup>107</sup>

- More extended analysis suggests that ratios are significantly better in the first decade of the century than in the 1990s. This could perhaps be explained by stronger competition among providers in the larger market or, in line with the suggestion proffered by Mitchell *et al* (1999) with the financial stability associated with lower risk-free rates.
- The spread between the minimum and maximum money's worth ratio is very wide in every year, 40 per cent in some years, suggesting that while some annuitants received excellent value for money, others might not have been so fortunate.
- Patterns across product types are consistent with what might be expected, with average money's worth ratios lower for younger retirees, smaller premiums, guaranteed annuities and, by a very small margin, immediate annuities over their deferred counterparts.<sup>108</sup>
- As the role of brokers in the distribution of products has reduced, competition purely on the basis of price has increased.<sup>109</sup>
- Providers have shifted some of their assets from government bonds into higher yielding corporate paper, which they have generally held to maturity to extract the liquidity premium. The higher levels of money's worth ratios from 2002 onwards suggest that competitive pressures have led providers to share the increased returns with their customers.

The analysis shows a market in which providers are competing keenly for business, on the basis of price, but are not ignoring the risks inherent in providing annuities to certain types of customers, as evidenced by the lower value available for annuities with longer expected duration and the higher value for larger annuities.

Nevertheless, the spread between the highest and lowest prices available, controlling for age, premium and gender, suggests either that customers are not sufficiently sensitive to price or that providers are competing aggressively on the basis of other factors, geographic location for example. Rocha and Thorburn report that the spread of prices is particularly large for small annuity premiums and suggest that this supports a theory of poor sensitivity to prices by customers.<sup>110</sup> These spreads

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<sup>107</sup> Rocha & Thorburn suggest that annuitants in Chile appear to be better off than their counterparts in other countries. This author supports that view, particularly in light of the fact that these annuities are all index-linked, but it may lend credibility to the argument that the main reason for poorer money's worth ratios in the United Kingdom is the adverse selection rather than an absence of appropriate assets.

<sup>108</sup> The depth of the available data was such that the authors could demonstrate statistical significance of all of these factors except for the distinction between immediate and deferred annuities.

<sup>109</sup> *"The illegal provision of increasing cash rebates to annuitants (made possible by increasing commissions) became a powerful element of competition in the 1990s, and the results confirm the substitutability between annuity rates and commission (which included the rebates) as two elements of price competition. The reduction in broker commission and rebates in the 2000s translated into higher annuity rates and enhanced the role of the annuity rate as the main instrument of competition."* (Rocha & Thorburn, 2006:202)

<sup>110</sup> This needs to be seen in the context of Chile's groundbreaking automatic quotation system available to all participants nearing retirement.

somewhat negate encouraging signs of a vibrant market in which educated consumers make rational decisions between competing suppliers.

Despite the evidence of good value for money for the market as a whole, some customers appear to be receiving much poorer terms than others. Evidence of high pricing spreads is considered in the next annex and its implications discussed in the main text of this paper.

## ANNEX 2: ANNUITY PRICING ANALYSIS FOR SELECTED MARKETS

The comments below and charts that follow them refer to an analysis of standardized annuity quotes for the United Kingdom (UK), Canada and South Africa, all falling into the so-called immediate annuity markets type.

This cursory analysis demonstrates the range of prices that characterize some markets, even large and apparently competitive markets like that of the UK. More efficient mechanisms to transfer price information to the demand side are surely called for. But the analysis also shows that studying prices alone is not sufficient to understand the dynamics of the market. Price is easy to determine; value much more difficult.

The price charged by an insurer may reflect its best estimate of the risk-adjusted value of its offering, but it may also include elements of margin to gain excess profit or discount to capture market share. There are a number of possible reasons for price differences that can only be revealed by more detailed consideration of a range of explanatory factors and it is recommended that policymakers seek to understand the dynamics of their markets more carefully.

### *The United Kingdom*

- The rankings of the annuity providers in the UK change very little across rating factors (refer to charts 1 to 4). Provider 1 is the most competitive in every case except for a joint life annuity purchased by a female principal, where its price is only just improved on by provider 7, and for an index-linked annuity, which it chooses not to offer. Provider 2 is the most expensive in every case except for a 55-year-old customer, in which case it is the second most expensive product. The intermediate ranked providers arrange themselves according to consistent ranking patterns, except by age, where there are a number of changes in their respective rankings, and with the introduction of inflation-linked increases, where pricing dynamics change significantly against those used for annuities with fixed nominal increases.
- This suggests that providers are generally not competing for specific types of customers or product profiles. It would appear instead either that there are systemic differences in the ability of the insurers to price competitively, perhaps due to their financial position or the scale of their annuity book. Alternatively, some providers may be competing for scale and others for profit.
- The changing patterns evident in the age-based figures (chart 2) suggest that different views are being taken by providers on mortality rates across age. Again, it is not clear why this is so. It may reflect differences in the past mortality experience of the providers, reflected in their assumptions about the corresponding future experience, or it may reflect a strategy to attract annuitants of a certain age (in the case of provider 4, for example, older annuitants) and not others.



- The distinction between the rankings on nominally guaranteed annuities and their index-linked counterparts (chart 3) is likely to reflect differences in the views of the respective pricing actuaries regarding the performance of the underlying assets and probably also differences in the asset mixes themselves.
- Strong competition on price is evident among a group of providers. The difference between six of the providers exceeds 5 percent only once.<sup>111</sup> Though provider numbers are much lower than they used to be, and the largest insurer now has a strongly dominant position (see section V) this cluster suggests that strong competition for annuitants remains a feature of the UK market.
- Products from provider 2 are consistently more expensive than the best available, by around 15 percent. Provider 8 prices its annuities below those of provider 2, but also consistently more expensive than the balance of the market.<sup>112</sup> Prices from provider 4 vary but are at times very competitive, for example, for older purchasers.<sup>113</sup>

### *Other countries*

- The corresponding analysis of the Canadian market (chart 5) shows a smaller range of prices across insurers actively quoting for business and a more complex interaction of rating factors and competitive dynamics, a sign perhaps of a healthier set of market dynamics. As a number of Canadian providers are regional specialists, the possibility of demographic differences in their customers should not be ruled out either.
- The South African market (charts 6 and 7 for male and female annuitants) also shows a relatively small range of prices. Different approaches to mortality rates are known by the author to affect annuity prices and some evidence of this is available in the clustered patterns of some of the providers, but there again appear to be other factors at play here, with provider 5 consistently offering the best terms and provider 2 trailing the others.

### *Comment on analysis*

With the exception of the outliers in the United Kingdom, these three markets show broadly similar attributes, a generally low price range, some attempt at differentiation by risk – or different views on what these risks are – and in some cases what appears to be pricing designed to capture market share.

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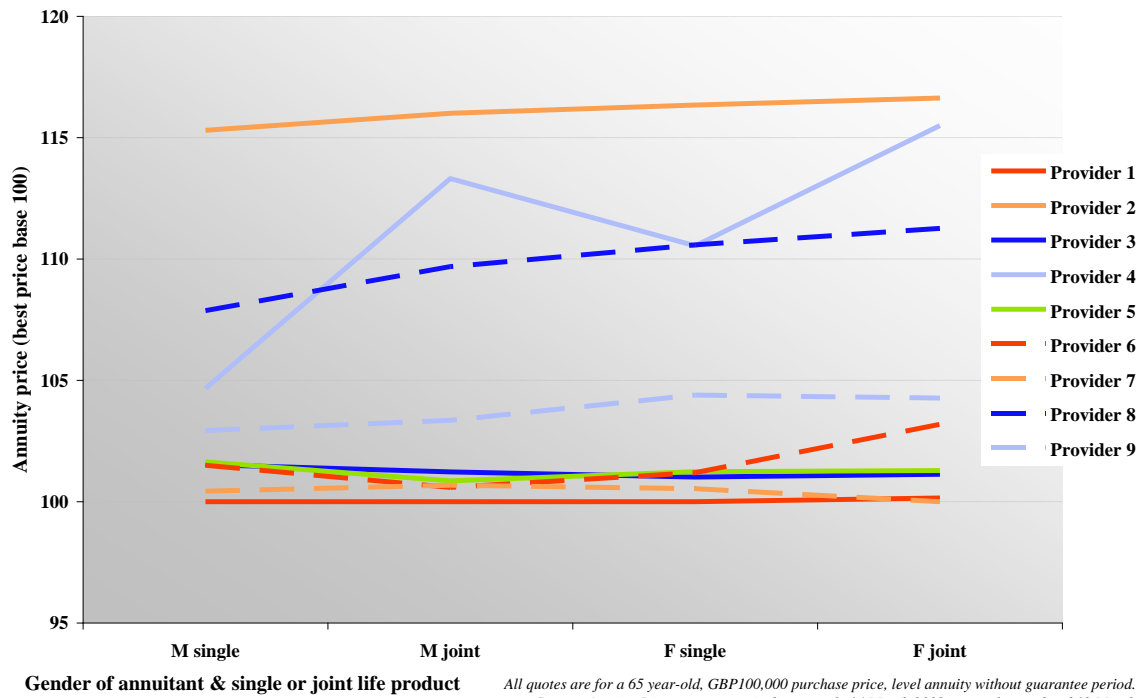
<sup>111</sup> This is consistent with Purcal's (2006) comment that only a small group of providers in the United Kingdom appears to be "serious players with good value products" (p 24), though he suggests that there are five.

<sup>112</sup> These two providers do not appear to have ambition for significant business in the broad market. This could be for any number of reasons. They may have a niche operation concentrating on special risks or a geographical area, very large annuities to wealthy individuals with longer expectation of life. They balance of their business may be such that they are not prepared to price as keenly as their competition. Or they may not be serious about the annuity market and are happy to take profitable business if they can get it. Provider 2 had a market share of 2.2% according to their 2004 returns to the regulator (Cannon & Tonks, 2006) and provider 4 sold less than GBP6 million in non-profit annuities according to the 2006 return (downloaded).

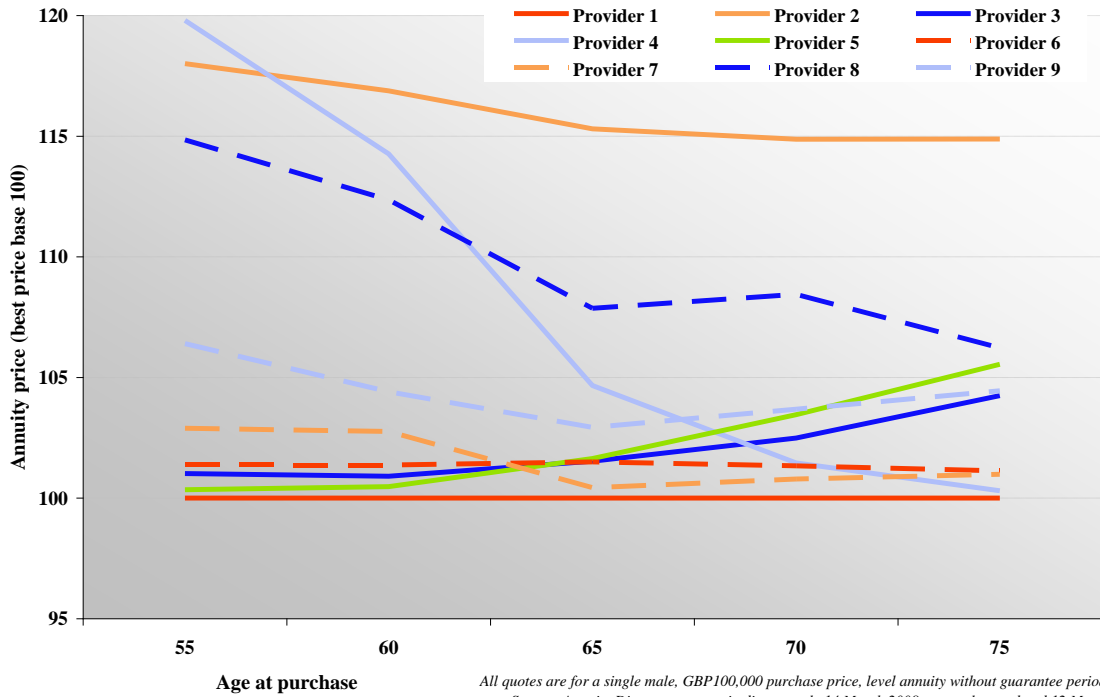
<sup>113</sup> The third appears to be selling reasonably well and may be focusing on selected parts of the market.

While this rather cursory analysis suggests three markets that are pricing reasonably competitively, it doesn't provide insights into the strategies of providers, whether they are pricing for market dominance, for example, or aiming for specific customer types whose risks they believe are being broadly mis-priced. Policymakers seeking to understand the dynamics of their markets should consider the much more thorough analysis carried out by Rocha & Thorburn (2006) on the Chilean market. Appendices in that publication describe in detail their study of the money's worth ratios and an economic analysis of the annuity rates.

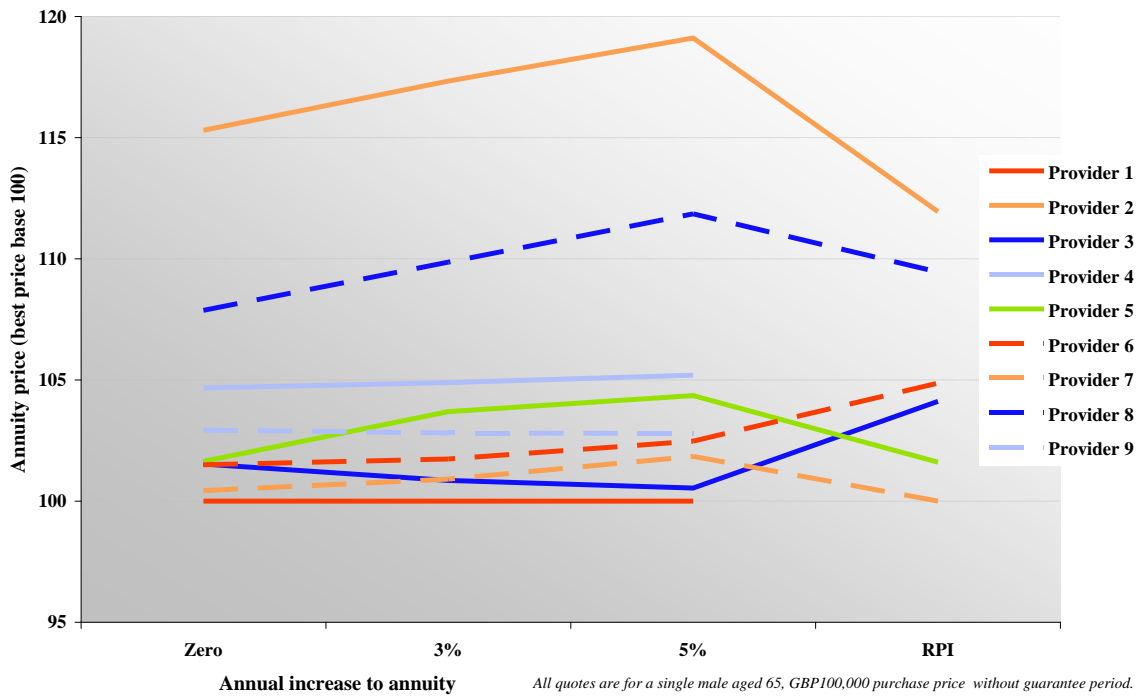
**Chart 1. UK pricing differences by gender and single or multiple lives**



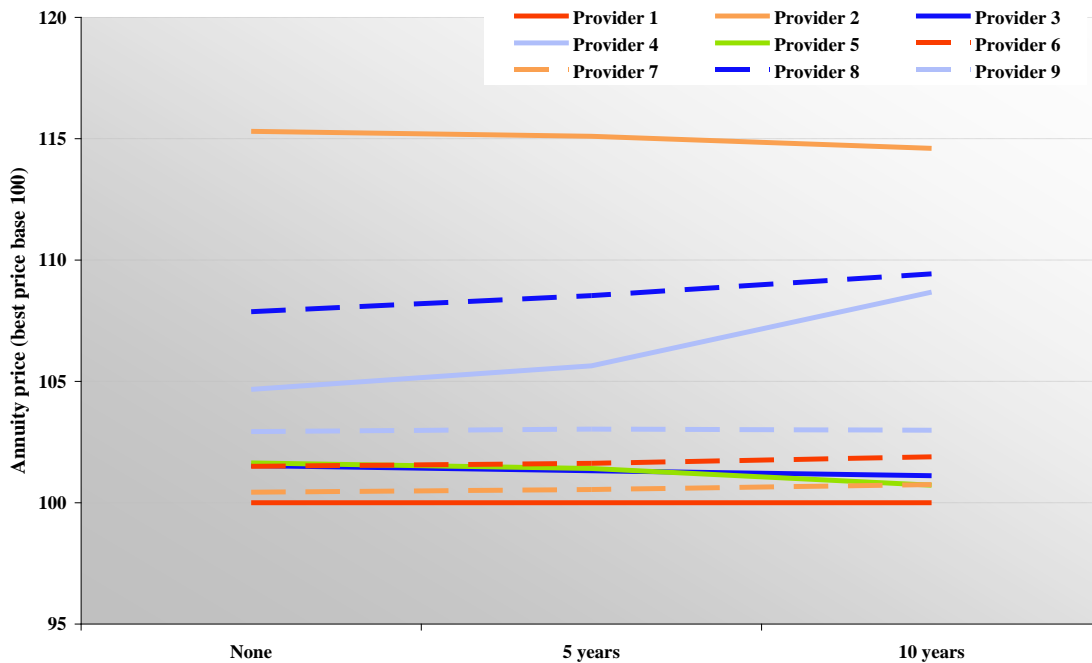
**Chart 2. UK pricing differences by age**



**Chart 3. UK pricing differences by rate of increase**

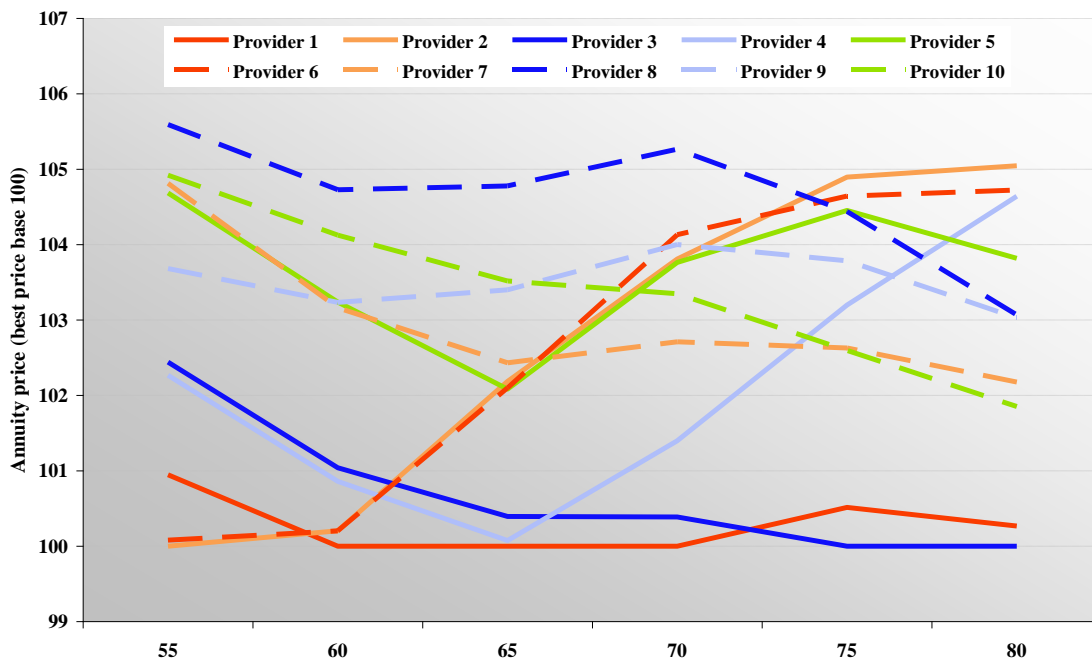


**Chart 4. UK pricing differences by guarantee term**



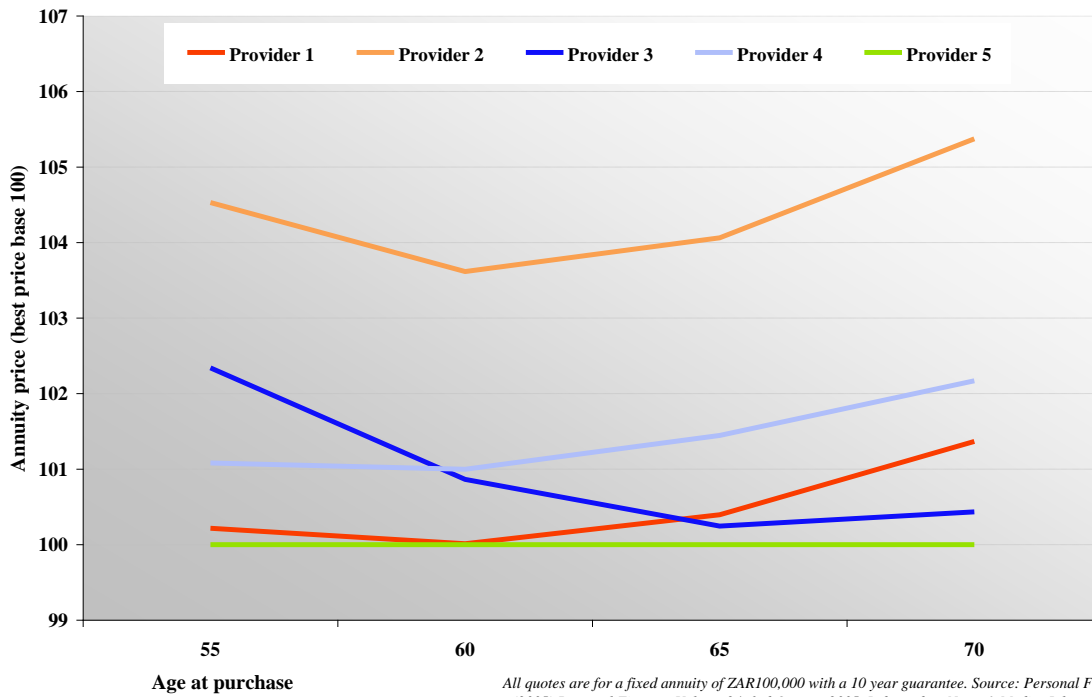
All quotes are for a single male aged 65, GBP100,000 purchase price, level annuity. Source: Annuity Direct, www.annuitydirect.co.uk, 14 March 2008, quotes last updated 12 March

**Chart 5. Canadian annuity pricing differences by age**



All quotes are based on a consideration of C\$100,000 from non-registered savings and include a 10 year guarantee but no annual increases. Source: Cannex, [https://www.cannex.com/canada/english/products\\_anc.htm](https://www.cannex.com/canada/english/products_anc.htm), accessed 11 March 2008

**Chart 6. South African pricing differences by age: males**



**Chart 7. South African pricing differences by age: females**

