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Retirement planning in the light of changing demographics

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ABSTRACT

With increasing longevity and decreasing fertility rates, governments and policy makers are increasingly engaged in the question of long term retirement planning. In many cases this has included emphasising the need for individuals to take more responsibility for their own retirement planning through tax incentives, compulsion and changes to the age at which state retirement benefits become available. In the case of Australia, as is considered here, long term retirement planning has been focused around the development of a compulsory defined contribution (DC) superannuation system. Here we investigate the interaction between population ageing and the sustainability of the superannuation system by modelling a general superannuation scheme to compare the adequacy of retirement funds under a number of alternative scenarios. The model incorporates stochastic longevity forecasts and provides insight into the sufficiency of compulsory retirement saving both now and future. We find that the current pension scheme is more robust to longevity improvements for mid-class individuals however significant gaps arise for low-income individuals as longevity improves. Without addressing these issues, government expenditure is expected to increase substantially.

1. Introduction

With the increase in longevity and decrease in fertility rates the 21st century has seen unprecedented demographic changes to our populations. These changes are placing pressure on public finances as population's age and the associated retirement and healthcare costs weigh heavily on the economy. Many governments and policy makers are considering the question of long term retirement planning and are developing policies designed to address the increased costs of our ageing populations. For a comprehensive survey, see OECD (2013).

The issue of ageing populations is an international one. The world ageing report (2013), for example, finds that population ageing is taking place in nearly all parts of the world and projects the proportion of the older population (that is, individuals aged over 60) will increase from 9.7% in 1990 to 21.1% in 2050. The OECD projects a similar trend suggesting that the proportion of the retired population to the working population will move from a current level of 20% to 28% by 2060.[1] When we consider that each additional year of retirement adds around 3% to the capital required to live in retirement,[2] it is clear that governments have had to act to address the obvious economic and financial consequences of this.

Whilst the answer seems clear; either we retire later or we save more, governments have to grapple with the political fallout of any decisions that they make, considering that the older population are usually seen as more vulnerable in society. In combination with the fact that the older population are more inclined to vote, it is clear why it may prove difficult to make sweeping policy changes to retirement planning. That being said, several options are open to governments and policy makers when considering how to reform retirement planning.

Firstly, governments may encourage individuals to save more of their own funds during their working life to complement any state funded pension provision. This is in line with the life cycle hypothesis, see for example Modigliani and Brumberg (1954) and Ando and Modigliani (1963). Encouraging individuals to save more can be done through tax incentives as is the case in the UK, see Attanasio et al. (2004), or in the extreme through compulsion, as is the case in Australia. One question that must be considered in either case is what is the correct level of contribution. In this paper we consider this question in the case of the Australian superannuation system.

Secondly, governments could consider increasing the state pension age. Bielecki et al. (2015b) pointed out that addressing the adverse changes in population structure by raising the retirement age enhances warfare universally. In many countries the process of increasing pension age has already begun[3] (see Farrar et al., 2012) but its implementation is

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[1] Source: OECD (2013) assuming a joint male–female retirement age of 65. Note that these are estimated based on the old-age dependence ratio.

[2] This is a consequence of the discounting rate and mortality table and is a well-known rule of thumb for actuaries. See for example the text Actuarial mathematics for Life Contingent Risks.

[3] For instance, the UK government gradually increases for women from 60 to 65 to match men's and it will plan to increase for both men and women to reach 66 by Oct. 2020. Meanwhile, the Australian government increases the Age Pension age from 65 to 70 by 2035.

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slow owing to the need to provide equity for those approaching retirement as well as managing the expectations of individuals.

Thirdly, and least affordable, the government could raise taxation elsewhere to cover the increasing cost of retirement and welfare although with longevity improvements showing no signs of slowing down this appears, at least of the face of it, to be an unsustainable approach to retirement planning.

In the case of Australia, the government chose to encourage individuals – through compulsion – to save for retirement themselves with the development of the superannuation system in 1992. The superannuation system in Australia is a defined contribution system whereby individuals in employment are required to enrol in one of either an industry sponsored or retail superannuation plan (Bateman and Piggott, 2003). See Australian Superannuation Legislation (2015) for more details. In each case the individual's employer is required to contribute into the plan on behalf of the employee. The superannuation guarantee (the minimum contribution required of the employer) started at 3% in 1992 and has gradually increased to 9% of salary by 2002. It is currently 9.5% (as of 2015) and will continue to increase in stages to 12% by 2025. Recognising the ageing population issue the government has also proposed changes to the state pension system, which in time will impact on superannuation. The Treasurer has proposed an increase in the Age Pension age from 65 to 70 by 2035 with the intention that these reforms will ensure the sustainability of the state funded pension. In the coming decades, the Age Pension will be more well-targeted to these in genuine need, and the superannuation system will gradually grow into the primary source of retirement income for the majority of Australians.

An issue that arises by placing more of the emphasis for retirement funding on the individual is that of longevity risk and whether the funds accumulated will indeed be sufficient to last the individual in retirement. This issue is more acute in the Australian system where post-retirement longevity risk remains with the individual due to the lack of a strong annuity market. Internationally, the question of the economic and welfare effects of longevity risk being faced by the individual is becoming more prevalent also. For example, even in well developed annuity markets such as the UK, compulsory annuitisation has recently been removed. One of the motivations of this paper, in the context of a significant longevity risk remaining with the individual, is therefore to model the adequacy[4] of retirement funds accumulated within the existing superannuation system. The basic state pension in Australia pays a single individual a pension of $867[5] per fortnight. The Association Superannuation Funds of Australia (ASFA) also defines modest and comfortable incomes in retirement as $23,682 per year and $42,861 per year respectively.[6] In this paper we define adequate to be the level of the basic state pension but note that the results of our analysis would change if we were to use modest or comfortable income as defined by ASFA.

The existing literature on questions around superannuation in the context of longevity risk is relatively scarce although mortality modelling is developed significantly in the past decades. A good survey paper on the various approaches to modelling mortality can be found in Booth and Tickle (2008). A possible reason for the lack of consideration of demographic changes on superannuation, as stated in Bielecki et al. (2015a), may be that demographic changes are seen to be neutral in the world of superannuation or DC schemes. However, as noted in that paper, changes in demographics will have a profound impact on individuals who will have to make the same amount of funds last them more years in retirement. Failing this, individuals may have to return to employment affecting the labour supply. Several papers consider the post-retirement

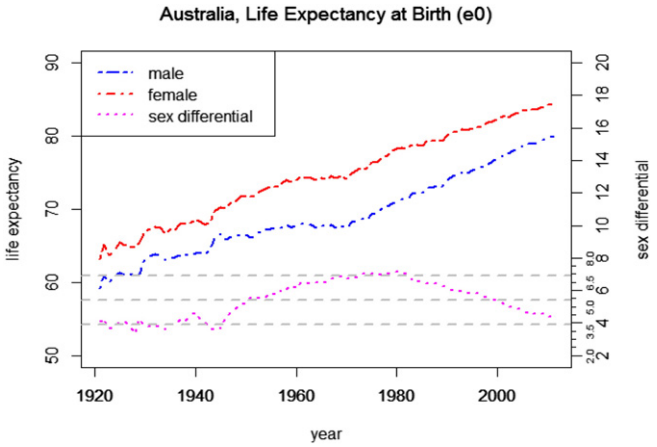

Fig. 1. Male and female life expectancy at birth (blue and red) and the sex differential in life expectancy (violet) in Australia from 1921 to 2011.
Data obtained from HMD.

options that are available to individuals. For example Lin et al. (2014) use a Monte Carlo simulation to evaluate the impact of various retirement options on early retirement. Further, the ageing population is likely to shift the financial burden from the state pension system to the superannuation system and this further highlights the need for a sustainable superannuation system. Several papers consider questions around pension system in the form of life-cycle models, see for example Creedy et al. (2015), or Koka and Kosempel (2014). In Creedy et al. (2015) the authors address questions around household savings and consumption in the event of changes to retirement policy and conclude that the effect on saving rate is modest. Koka and Kosempei (2014), on the other hand, use a life cycle model to consider the welfare implications of a removal of the mandatory pension age, concluding that overall there would be a reduction in the welfare of the individual.

To our knowledge there is very limited work in the economic modelling space considering the adequacy of superannuation systems for individuals. Given the large longevity risk that individuals face, and the corresponding risk that the economy faces through pressure on the state pension system, we feel that questions around the level of contribution and the optimal retirement age are important issues to consider economically. Our paper contributes to the literature in this area by first modelling the current Australian superannuation system and then considering the impact of changes to the contribution level and/or retirement age on the shortfall in funds required to sustain a adequate retirement income. We stochastically project mortality rates as well as a forecasting of the accumulation of funds invested and address questions around the future sustainability of the current system.

The remainder of the paper is set out as follows. In the next section we discuss the data that we have used to fit and forecast our mortality model. Section 3 discusses the methodology, the mortality forecasting model we use and how we incorporate that with our investment accumulation model. Section 4 presents and discusses our empirical results, considering the current system and various scenarios of different contribution rates and retirement ages. We conclude with some policy recommendations and further research in Section 5.

2. The mortality model

2.1. The Hyndman–Ullah method

The forecast accuracy of mortality rates is a key assumption in our superannuation model. We spend some time here discussing the approach before moving onto the superannuation model.

We use the Hyndman–Ullah method (Hyndman and Ullah, 2007) and the product-ratio method (Hyndman et al., 2013) to forecast the

[4] For the case of superannuation in Australia, we define an "adequate" level of retirement income as the government funded state pension rate for low income individuals as of 2015.

[5] See http://www.humanservices.gov.au/customer/enablers/centrelink/age-pension/payment-rates-for-age-pension for details of the state pension levels.

[6] Details on ASFA modest and comfortable retirement incomes can be found at http://www.superannuation.asn.au/resources/retirement-standard.