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Title:
The Economics of Ageing—What Do We Face?

Date:
2020-12-22

Citation:
McDonald, I. (2020). The Economics of Ageing—What Do We Face?. The Australian Economic Review, 53 (4), pp.586-597. https://doi.org/10.1111/1467-8462.12391.

Persistent Link:
https://hdl.handle.net/11343/276922

For the student The economics of ageing-what do we face?

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Abstract

We, as taxpayers, face challenging problems in assisting the well-being of old people mainly because, as explained in the previous article, McDonald (2019), preparing for and living through old age is a risky business. Through government, taxpayers can provide some insurance against the risks of old age, especially the risk of bad health and the risk of a long life. However, the ageing population suggests that maintaining this support will require increased taxation. This article quantifies this challenge for Australia and concludes that although increased taxation may be required it will be easily affordable from the much higher incomes generally received due to the secular increase in productivity.

1. Introduction

The first of these two articles, "The economics of ageing-what do we face?", McDonald (2019), focussed on the challenges to your well-being that you as an individual face in preparing for and living through retirement. The focus in this article is on the challenges we as a group face in assisting the well-being of the increasing proportion of old people in the population. We as a group means we as taxpayers, that is us in paying for the substantial support that we provide, through the government, to support the well-being of old people.

As I explained in the previous article, you face many risks in preparing for and living through retirement. Financial risks will affect the value of the wealth you accumulate to help finance your expenditures when you retire. Health risks will affect a number of things: when you retire, with a premature retirement truncating your ability to accumulate wealth for retirement; what health expenditures you will need including whether you will need aged care with its associated costs; and how long a life you will have over which your expenditures will need to be financed by someone, usually a mix of you, your families and taxpayers.

[1] I thank Ross Guest and Glenn Withers for helpful comments.

These risks can exert a large loss of well-being for you if you make an unlucky draw. For example, bad health can be very expensive to treat. Because you know little in advance about whether you will be an unlucky person, it is beneficial for all people to participate in schemes to insure against these risks. Taxpayers, through government, finance a number of insurance schemes, most importantly medical expenditures and aged care expenditures for those who draw a bad health risk, and income payments to those who draw a long life, that is the old age pension which continues until death.

In addition to insuring you against risks associated with old age, there is a redistributive component in government programs. With the secular rise in productivity, which has been going on since the beginning of the Industrial Revolution, older people will have, on average, earned smaller amounts during their lifetimes than have younger people and so a degree of redistribution from young to old contributes to equality.

The sum total of these decisions by government has important macroeconomic implications. Government assistance to old people has to be financed by taxation, that is by the taxpayer. Thinking as an economist, we recognise that someone has to pay for government spending. There is no Father Christmas who will provide government services for free. When people say "the government should pay for that" they are setting up an illusory source of finance.

The likely prospect of an ageing population, that is an increase in the share of old people in the population, will put upward pressure on the level of government expenditure in the future. High government expenditures per old person multiplied by the increase in the proportion of old people in the population will drive an increase in government expenditure. This is a major fiscal challenge which we are starting to experience. This article explores just how big a challenge it will be.

Section 2 shows the relatively high levels of government expenditure on older people compared with younger people. Section 3 shows that life expectancy, fertility, and net immigration are the major determinants of the share of older people in the population, with increased life expectancy and decreased fertility being the main drivers of the ageing population. To assess how government spending will be affected by the rising share of old people in the population, Section 4 discusses how government spending per person can be projected into the future and, using this projection and the projection of the age distribution of the future population, Section 5 reports the effect of the ageing population on the projection of the future share in GDP of government spending. This, as discussed in Section 6 is the tax burden of maintaining the government’s support for the old. The tax burden, while positive, is shown in Section 7 to imply on its own a small loss of living standards of Australians, a loss that is dwarfed by the much larger rise in living standards due to the secular rise in productivity. Section 8 discusses the trade-off between the living standards of old and

young as a basis for our choice in facing the issue of supporting old people when the population is ageing.[2]

2. The expense of older people

For the government, old people are an expensive proposition. Figure 1, which is Figure 5.1 in the Productivity Commission's 2013 report on ageing, Productivity Commission (2013), shows how government spending per person varies with the age of the person. The high levels of government spending at the older ages on the right side of Figure 1 reveal just how expensive, so to speak, old people are. The peak, for people in their 90s, is almost five times government expenditure for middle aged adults. For these very old people, spending per person on aged care and health is particularly high. By contrast, spending per person on the age pension does not vary much during old age.

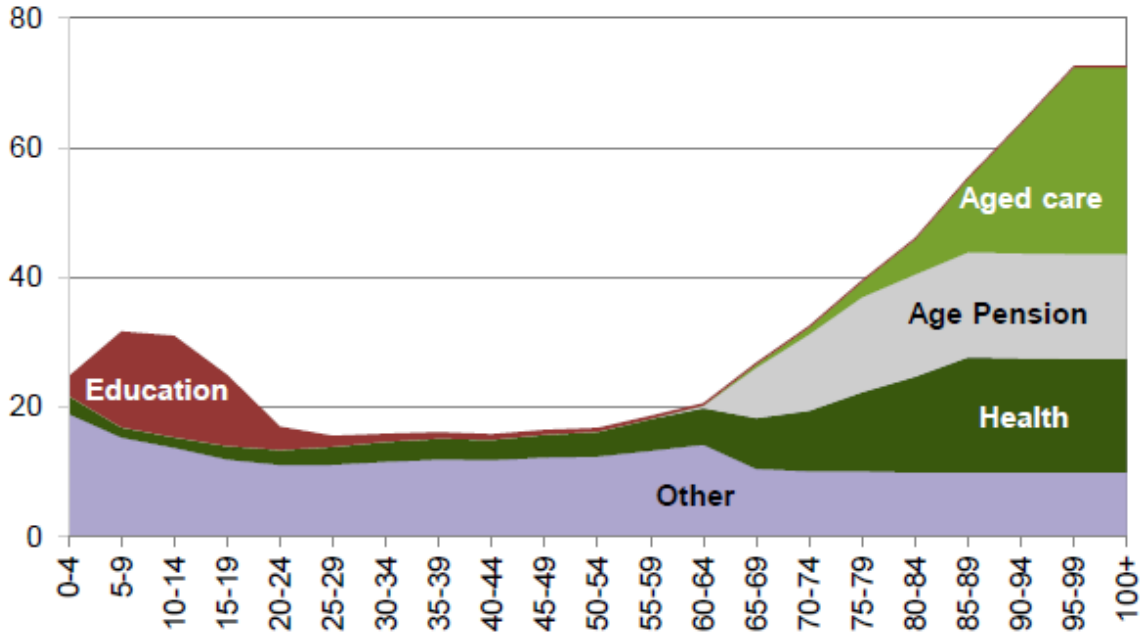

Figure 1 Age-related government spending, All governments, $'000 per person, 2011-12. Source: Productivity Commission (2013)

The other bump in Figure 1 is at young ages, mainly due to education.

Can the level of support for older people shown in Figure 1 above continue? Demographic projections project the number of working people per aged person will fall such that Australia will go from 3.7 working age adults per old person in 2017 to 2.9 in 2050, calculated from ABS (2018, Table B9). This appears to suggest a

[2] This paper deals with the Australian situation. Information on other countries can be found in sources such as OECD (2019).

shortage of working age adults and thus a support crisis. Is this a reasonable suggestion?

In fact, it is better to focus on government spending on old people in the future than the simple demographic ratios of working age adults per old person. It is government spending that will have to be paid for. So, what do the demographic projections imply for projections of government spending?

3. Projecting the proportion of old people in the population

The method to project government spending in the future is simple. For a particular date in the future, one calculates using demographic projections the number of people in each age group and then multiplies those numbers by the projected level of government spending per person of people in those age groups, and then adds up the government spending across all age groups.

The main drivers of demographic projections are life expectancy, fertility, and net immigration. Demographers have fairly straightforward mechanisms for deriving the total population and its age structure from these drivers. We needn't worry about those mechanisms. However, it is interesting to consider the patterns of the demographic drivers. I use data from the Productivity Commission (2013) because their projections of government spending discussed later are based on this data.

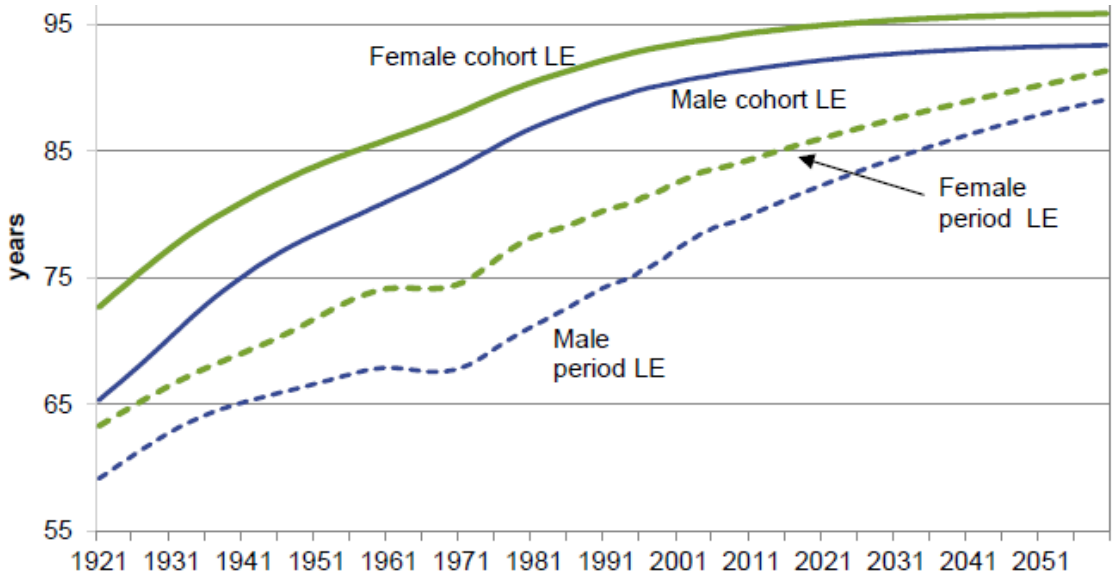

Figure 2 Life expectancy at birth. Source: Productivity Commission (2013).

Figure 2, which is Figure 2.5 in Productivity Commission (2013), shows life expectancy at birth for Australia from 1921 to 2060. Period life expectancy is based on death rates by age of the existing population. Cohort life expectancy takes into account the tendency of life expectancy to increase over time. Thus, cohort life expectancy tends to exceed period life expectancy, as Figure 2 shows.

The important feature of Figure 2 that contributes to the ageing population is the large increase in life expectancy over the 20th century. Cohort life expectancy has increased from about 73 years for females, 64 years for males in 1921 to 95 years for females and about 91 years for males born today. There has been some closure of the gap between female and male life expectancy but a gap remains and is not projected to narrow much in the future.

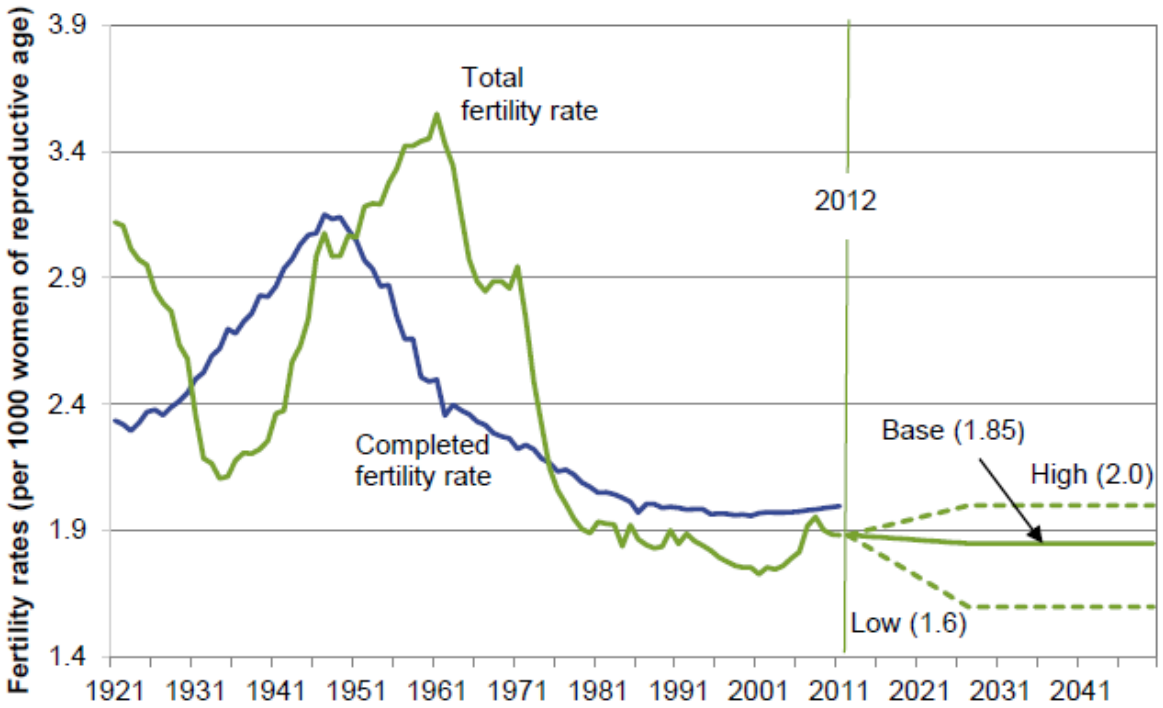

Figure 3 Completed and total fertility rates. Source: Productivity Commission (2013).

Figure 3, which is Figure 2.3 in Productivity Commission (2013), shows fertility rates for Australia from 1921 to 2050. The total fertility rate measures the number of children that a woman would bear if she were to experience the current age-specific fertility rates. The completed fertility rate uses extrapolation techniques to estimate how many children a woman will actually bear in her life. A fertility rate of about 2.1 is required to maintain the size of the population, assuming no immigration.

The decrease in the fertility rate shown by both measures will contribute to an increasingly aged population. The rather large decline in the total fertility rate in recent years led to alarm by some demographers, but that was quelled by the subsequent increase in the fertility rate of women in their 30s. This is called the tempo effect: the fertility rates of women in their 20s fell and then subsequently the fertility rates of women in their 30s rose. Women delayed child birth.

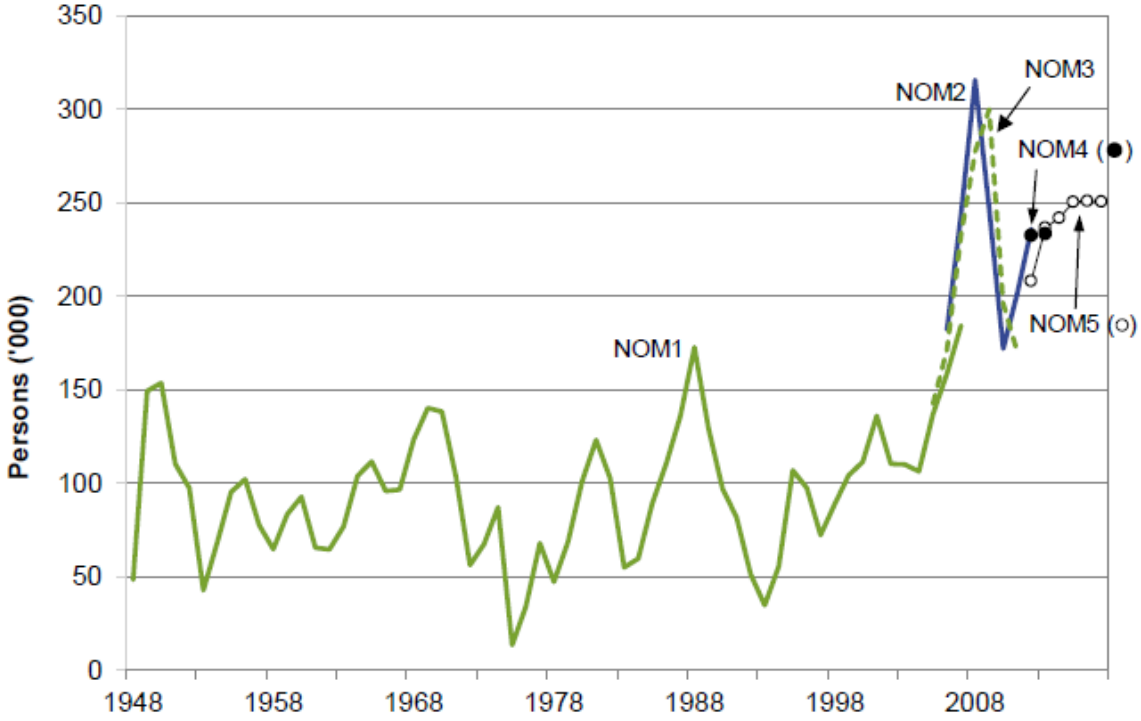

Figure 4 Measures of Australia's net overseas migration. NOM1 to NOM5 are based on various assumptions. Source: Productivity Commission (2013).

Figure 4, which is Figure 2.2 in in Productivity Commission (2013), shows net overseas migration into Australia for the period 1948 to 2017. Note that in recent years net overseas migration has been very large relative to early years. This partly reflects strong relative economic and income growth in Australia compared with other countries, which made Australia an attractive destination. Immigration is of course strongly influenced by government policy.

High immigration tends to reduce the ageing of the population, although of course eventually immigrants themselves get old.

The share of older people in the Australian population resulting from the demographic drivers, which are life expectancy, fertility, and net immigration, are shown in Figure 5. The share of the 65+ began a large increase in about 1960 and this rate of increase is expected to continue until 2040. The share of the 85+ is of particular interest because, as we will see, government expenditure on the very old is much higher than just on the old. Their population share increased mildly during the 20th century but in the 21st century has increased and is projected to increase markedly.

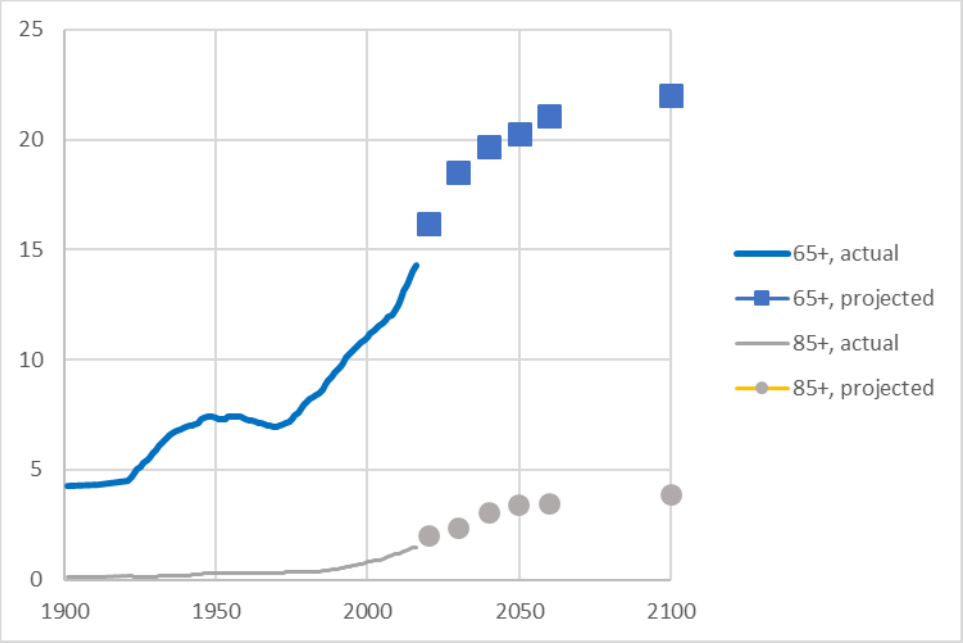

Figure 5 Population shares of older people in the total population, Australia, 1900 to 2100
Sources: Actual from ABS 3105.0.65.001; Projected from Productivity Commission (2013, Table 2.2)

To calculate total government spending in the future we multiply the number of people of each age group by projected future spending per person by age. But how is the latter calculated?

4. Projecting government spending per person

We can calculate the current levels government spending per person by age from actual data, as shown above. The challenging step for projecting future spending is to go from these current levels to projected future levels. Of course, we do not know what is going to happen in the future to government spending. There will be many technological changes especially in medicine and aged care. And attitudes may change, such that taxpayers/voters may be less prepared to support old people. Or it could go the other way with a more generous feeling for older people.

To find a way through these unanswerable questions, it is useful to base projections on the assumption of "unchanged government policy", which is that real expenditures per person by age increase with the rate of growth of labour productivity. This assumption has two main advantages. It has a degree of realism and it is easy to interpret.

First consider the degree of realism. Hold in mind that over the long term, real wages across all industries tend to increase with the general increase in labour productivity in the economy. Because of this tendency, to maintain the relativity of the age pension with respect to the general level of wages would require pension payments per old person to increase with the growth of labour productivity.

For health care and aged care, projecting future costs is more difficult. Wages in those industries may be reasonably expected to increase with the general increase in wages in the economy, and this implies that cost per patient and cost per age care recipient will increase with wages. However, productivity will also increase in those industries. This on its own would put downward pressure on costs. A benchmark approach is to assume that these cancel out and so under unchanged government policy what people are getting from government subsidies to health and aged care is increasing in step with what people are getting from their other categories of consumption, from cars, clothing, housing and so on.[3]

With regard to ease of interpretation, note that projections are not saying what will happen, but instead are saying what would happen under certain assumptions. That means they require interpretation. And they will be easier to interpret if they are based on assumptions that are reasonably easy to understand.

The projections made by the Productivity Commission do not follow exactly this benchmark assumption of unchanged government policy. Instead they include for some items of government spending an assumption of growth which is not the growth of labour productivity but instead is called the non-demographic growth rate. For example, they assume that new medical procedures will increase demand and so grow at a faster rate than labour productivity. Furthermore, they assume that as the superannuation guarantee matures there will be some reduction in age pension payments.

In my view, the variations from the "unchanged government policy" assumption made by the Productivity Commission in their projections is unfortunate. It makes it much harder to interpret their projections.

And sometimes, this type of variation can lead to absurd results. For example in the first intergenerational report by the Australian Treasury, their assumption of a non-demographic growth rate for PBS spending implied, as pointed out by Ross Guest and me in Guest and McDonald (2003), that by 2126, spending on the Pharmaceutical Benefits Scheme would account for 100% of GDP!

5. The projections of government spending

Using the demographic projections of population by age and assuming (almost) unchanged government policy, what will the level of government spending be in the future? The Productivity Commission (2013) in their 2013 report projected an increase of 5.8 percentage points of GDP over the period 2011-12 to 2049-50 in total

[3] Service industries are sometimes thought to have low productivity growth. However, increased automation in aged care is a distinct possibility because many aged care activities such as washing patients are mechanical and could be done ultimately by robots. Indeed, one can imagine the completely automated aged care facility. To avoid the inhumanness of this prospect, activities aimed solely at human connections could be developed.

spending on the age-related components, that is health, age pension, aged care, disability support and education by all levels of government, that is Commonwealth, State and local.

The expression "an increase of 5.8 percentage points of GDP" is based on the total level of spending on the age-related components going from 16.9% of GDP to 22.7% of GDP, as you can see in Table 1. It is much easier to interpret numbers scaled by GDP than numbers in their raw form of billions of dollars. Compare “what is $1 billion?” with “what is 22.7% of GDP”. The latter is easily thought of as roughly speaking an average rate of tax that you may be expected to pay of 22.7%. That makes sense. A billion dollars requires further steps to put it into interpretable form.

Of course, newspapers, the media and politicians often report magnitudes in billions of dollars. This is done for drama rather than understanding.

Academic economists have also made projections. Ross Guest and I in Guest and McDonald (2002) projected an increase in age-related government spending over the period 2009 to 2049 of 7.8 percentage points of GDP. More recently, Kudrna, Tran and Woodland (2015, Table 5) projected an increase of 4.9 percentage points of GDP over the period 2010 and 2050.

The important point about these projections is not their differences but their similarity. They suggest that an increase in government spending due to the ageing population somewhere in the range of 4.9 to 7.8 percentage points of GDP over the 40-year period seems to be a reasonable projection assuming unchanged government policy.[4]

Table 1 Government spending (all Australian governments, % of GDP)

	2011-12	2049-50	Difference (2049-50) – (2011-12)
Health	6.5	9.8	3.3
Aged care	0.8	2.2	1.4
Age pension	2.7	3.7	1.0
Disability support	1.5	2.1	0.6
Education	5.4	4.9	-0.5
Total	16.9	22.7	5.8

Source: Productivity Commission (2013)

[4] Across the G20 countries, projections suggest the increase in government spending due to ageing to be between 4.5 and 11.5 percentage points of GDP, see OECD (2019, Figure 14). Among these projections, Australia is at the lower end. The Australian number is consistent with the projections reported here in the text.

Table 1 shows the breakdown of the Productivity Commission projections of age-related government spending. We see that the biggest increase is for spending on health, projected to increase by 3.3 percentage points. The second biggest increase is for aged care, for which the spending share will more than double over the projection period. The increase in the age pension is not large, being a mere 1 percentage point of GDP.

Note that spending on education is projected to decrease by 0.5 percentage points of GDP. This is because with the ageing of the population, the proportion of the population that is young will decrease. In contrast, in the 1950s and 1960s, the expenditure share on education increased by a large amount because of the baby boom.

In terms of reliability, the projection for the age pension is more reliable than the projections for health or aged care. The projection for the age pension will occur if the age pension is held roughly constant as a proportion of wages, an assumption that is widely supported across political parties. By contrast, for health and aged care the future course of technical progress and the demand for services is very uncertain. The assumption that real expenditures per person by age for health and aged care increase with the rate of growth of labour productivity is a reasonable benchmark but should be regarded with caution.

6. Financing government spending

Generally, government spending is paid for by taxation. In as far as revenues from taxation fall short of government spending, then the government has to borrow. For long periods of time, the decades in the perspective of this article, persistent borrowing is not an option. So, the projections tell us that, under unchanged government policy, income tax rates or the GST or other taxes will have to increase in the future to cover the increase in government spending of between 4.5 and 6.8 percentage points of GDP.

However, increased usage charges such as increased co-payments for health services and aged care, the latter financed perhaps to an increased extent from the housing wealth of older people, can reduce the size of the increase in government spending and thus reduce the required increase in taxation.

It is often suggested that an increase in productivity in health services or aged care will reduce the costs without reducing the quality of service. However, improvements in productivity may also increase the demand for services.

Is the increase in taxation suggested by these projections of government spending feasible? It would not lead to economic disaster and so from the point of view of economics it is feasible. Many countries operate well economically with a

substantially higher rate of taxation than Australia, see Kleven (2014). The barrier to an increase in taxation is political rather than economic.[5]

Suppose voters and taxpayers refuse to allow a general increase in taxation? Then, because government spending has to be paid for, there would have to be a reduction in spending relative to the unchanged government policy assumption. Some government services, not necessarily age-related government services, would have to be cut.

What is best, increased taxation or decreased government services? Or some combination of these two? Well, economics gives us guidance on how to answer this question. Economics is based on the presumption that human well-being is all that matters. In the context of government spending for aged people, it is their well-being and the well-being of the rest of the population that matters.

7. How will the future ageing of the Australian population affect well-being?

So, what are the implications of the ageing population for future levels of well-being?

First, how do we measure well-being? Happiness surveys are increasingly used by economists to measure well-being. However, here I use a measure that is more orthodox and acceptable to most economists, that is the level of consumption spending.

Of course, it is not total consumption spending in an economy that is important. One has to take into account how many people there are in an economy and thus how many people are supported by total consumption spending. And it is also the case that consumption demands vary by age. As we have seen, old people are expensive.

Children consume less than adults, indeed in terms of privately-financed consumption a common assumption is that a child consumes 50% of the consumption of an adult. For old people it is more complicated. There are pressures going both ways. Old people require more because of health and aged care expenditures and less because they don't work and therefore do not have work-associated expenditures such as smart clothes and the costs of commuting.

Table 2 Relative consumption demands by age group

Age group	0-15	16-24	25-39	40-49	50-59	60-64	65-69	70-74	75+
Relative consumption		0.89	1.00	0.98					

[5] In as far as ageing leads to an increased share of retired people who do not receive income from work, a change in the tax mix away from income tax and towards taxation of income from superannuation and a wealth tax may be desirable.

demand	0.68				1.00	1.05	0.87	0.95	1.19
Source: Guest and McDonald (2003)									

Putting these various considerations together, using data on private consumption by person by age and also on government consumption by person by age, we arrived at the relative consumption demands by age shown in Table 2, from Guest and McDonald (2003). You can see that for old people relative consumption demands decrease in the early retirement years and then increase as people get very old, reflecting their poor health.

We can think of the relative consumption demand of a person of a particular age as the number of age-adjusted persons that that person represents. Thus, from Table 2, setting the relative consumption demand of a 50-year-old at one and we can say that a 50-year-old is equal to 1 age-adjusted person. Then consider an 80-year-old. The relative consumption demand of an 80-year old is 1.19 and so we can say that an 80-year old is equal to 1.19 age-adjusted persons.

Put differently, a given amount of consumption can support more 50-year olds than 80-year olds. Old people are “more expensive”. Children are cheap.

Thinking this way, we can calculate the average living standard of the total population by dividing the total level of consumption by the total number of age-adjusted people. The latter is simply the sum of all the people in the economy weighted by their relative consumption demands.

From this we see that if there is an increase in the proportion of very old people in the population then the population adds up to more age-adjusted people and so with a given total level of consumption, the average living standard of the total population would decrease.

So how will the average living standard progress in the future and what will be the effect of the ageing population? The answer that Ross Guest and I calculated is shown in Figure 6, discussed in Guest, and McDonald (2003). To calculate this, we had to calculate the future levels of total consumption. Explaining that would take us far beyond this subject. For our purposes, a lot of thinking and calculating led to a path of total consumption per natural person that will grow with the rate of labour productivity growth. In Figure 6, this is shown by the dashed line.

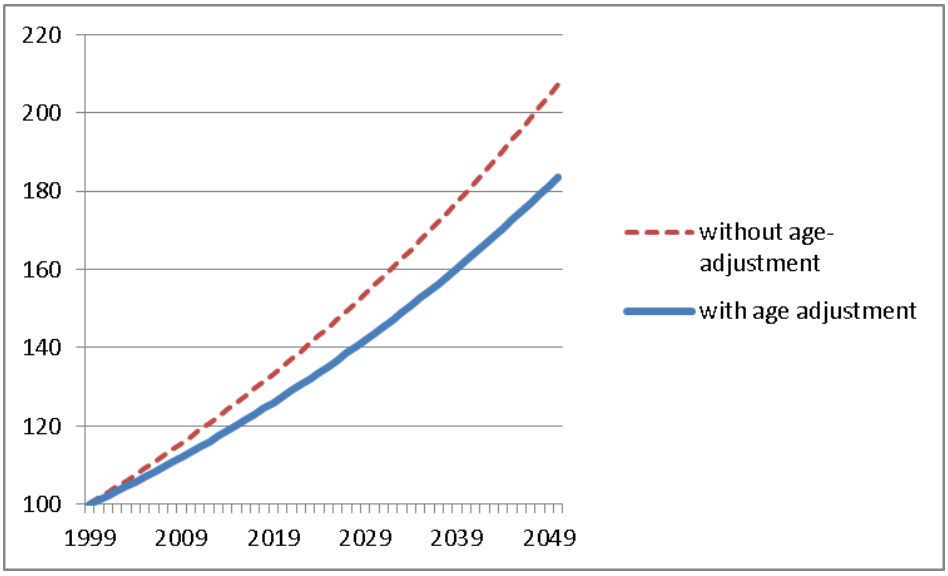

Figure 6 The impact of ageing on projected living standards, Australia, 1999 to 2050

This is consumption per natural person, as we might say. In our projection shown in Figure 6 it grows at 1.43% per year, which is the historic trend rate of growth of labour productivity. But now allow for the ageing effect. As the 21st century proceeds, the proportion of very old people in the population will grow. As we have seen these very old people have relatively high consumption demands. And so the total number of age-adjusted persons will grow faster than the total number of natural persons. This ageing effect is taken into account in the unbroken line in Figure 6 which shows the level of consumption per age-adjusted person. This is the average living standard allowing for the effects of ageing.

One can see that the unbroken line lies below the dashed line and so, as expected, the increase in the aged share in the population will have a negative effect on the growth in living standards. But what you may not have expected is that the negative effect on living standards of the ageing population is very small. Compare 2050 with 1999. In the hypothetical case of no ageing, living standards will rise by 107%. In the realistic case of an ageing population, living standards are projected to rise by 84%. Compared with the huge effect of productivity growth on living standards, the effect of the ageing population is small.

I don't think anyone would really notice the difference between 84% and 107% over a period of 50 years. Consider putting this in terms of annual growth rates. The rate of increase of living standards without ageing is 1.43% per year and with ageing is 1.20% per year. Would you notice this difference?

8. How much support should the taxpayer provide for the old?

We have seen that projections of government spending suggest that the ageing population will lead to an increase in the share of government spending in GDP should government policy remain unchanged, as defined by the unchanged

government policy assumption. We have also seen that the ageing population will exert downward pressure on living standards in the future but this downward pressure is small relative to the gains in living standards due to productivity growth.

In this section, we put these findings together by addressing the question “how much support should the taxpayer provide for old people in the future?”

Thinking as an economist we know that well-being matters. Applying this thinking to the question of taxpayer support, the optimal level of government support for old people balances their well-being with the well-being of younger people.

Economics is non-discriminatory in that the well-being of all people matters, in this case the well-being of the young and the well-being of the old. That perspective implies we balance the well-being of the old with the young. There is a trade-off, or alternatively expressed, an opportunity cost – more well-being for the old comes with the cost, the opportunity cost, of less well-being for the young.

To develop the nature of this trade-off, first consider the projections made by Ross Guest and me, reported in Guest and McDonald (2002). According to these projections, comparing 2050 with 1999, taxation will have to increase by 8.3 percentage points of GDP to finance the increase in government spending required to maintain the relative living standards of old and young people.

And also, also noted above, the projections by Ross Guest and me show that with this increase in taxation both old and young people would enjoy an increase in living standards of 84% over the period 1999 to 2050.

In Figure 7 the living standards of young people are measured on the horizontal access and the living standards of old people are measured on the vertical axis. (Figure 7 is discussed in more detail in Guest, and McDonald (2003)). These are the living standards in 2050 relative to 1999. Thus, the situation where the living standards of both young and old increase by 84% is shown by the dot on the dashed line, the 45-degree line. So, at this point, relative living standards do not change and taxation increases by 8.3 percentage points.

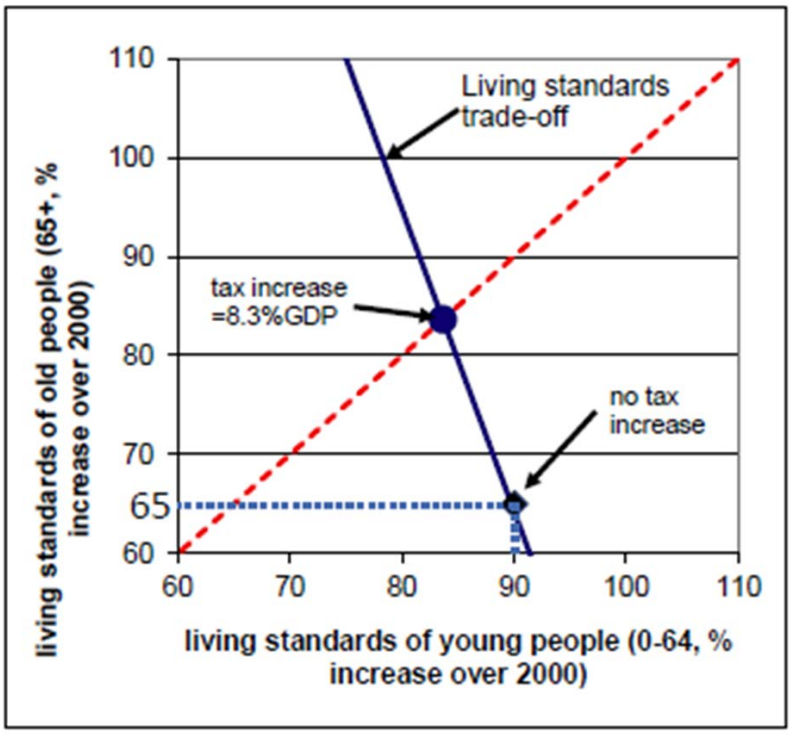

Figure 7 The living standards trade-off

Now suppose that voters refuse to allow an increase in the tax share and they insist that government spending for the old has to be adjusted downwards to keep the government's total spending within this fixed tax share. This means that government spending on services for old people will have to decline as the population ages whilst the living standards of young people will get a boost from not paying increased taxes. Calculations show that this case of no increase in tax share would lead to an increase in the living standards of young people of 90% and an increase in the living standards of old people of 65%. This outcome is shown in Figure 6 as the point labelled "no tax increase".

The downward-sloping line connecting these points and extended beyond them is the living standards trade-off between young and old. We can consider any level of taxation and infer from the line the implication for relative living standards.

Note that the old will enjoy increased living standards even if government spending on them is constrained by the constant tax share. Productivity growth is strong enough to ensure that. But the relative living standard of old people would deteriorate compared with young people.

There is an additional point. Reduced government support will fall on those unlucky enough to suffer bad health or live for a long time. Thus, there would be an increase in inequality for unlucky old people relative to other people.

So, what is the best point on the living standard trade-off to aim for? How should we balance the living standards of the old with the living standards of the young? Is the current relativity fair?

To answer this question depends ultimately on value judgements about the relative importance ascribed to old and young people. These value judgements are perhaps personal although they are strongly influenced by social considerations, that is by the views of others.

However, there are some arguments that favour staying with the current relativity and especially not moving the relativity away from the interests of old people. Note first, that people are accustomed to the current relativity. I am assuming here that the relativity has not changed much in recent decades, which seems reasonable.

To reduce government services such that the relative living standards of old people decrease could be seen by old people as a breach of a social contract. Today's old people, when they were young, supported the previous generation of old people. They probably went along with this partly at least in the expectation that they would be treated in a similar way.

Furthermore, as the life-cycle model makes clear, see the previous article, in as far as old people had planned during their working lives for the level of government support to continue such that the relative living standards of old and young would be maintained, an unexpected reduction in government support could leave them high and dry. They would not have working lives left that would allow them to build up assets.

9. Conclusion

We will face a growing proportion of old people in the population for the next three decades at least. Old people receive a lot of support from us, through government. They are expensive. The prospect of an increasing proportion of old people raises the spectre that our continuing support will be impossible. However, this fear ignores the fact that because of the continuing growth of labour productivity, we who will finance this support will be better off than we are today and will indeed be well able to support older people.

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