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Prospective demographic change and Australia's policy agenda for the 21st century

Ross Guest
School of Accounting and Finance
Griffith University
and

Ian M McDonald
National Australia Bank Professor of Economics
University of Melbourne

ABSTRACT

Australia is facing a substantial ageing of its population. Our research calculates under various assumptions the future level of living standards. It shows that, notwithstanding the ageing population, there will be a substantial increase in living standards in the future, almost doubling in the next 50 years. Furthermore, future living standards are more or less independent of future rates of fertility and future rates of immigration. Lower fertility and higher immigration have slight positive effects on living standards but the effects are so small that we feel the best way to describe the relation is one of independence.

In considering the policy agenda for the future, an important lesson to be learned from the past is that decisions by Australian residents in the past have led to a healthy growth in living standards. From this and from our finding that decreases in fertility or changes in rates of immigration will have an essentially zero impact on living standards, one can conclude that no radical changes in policy in the future are required to ensure that living standards continue to grow. If we carry on as we have been doing, then living standards will continue to grow. There is no crisis for living standards on account of population ageing.

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Ross Guest
School of Accounting and Finance
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Australia is facing a substantial ageing of its population. At current rates of fertility and immigration, by 2050 the ratio of people aged 65 years or more to people of working age will double, from 20:100 to 40:100. Furthermore, if rates of fertility and immigration fall this measure of old dependency will increase further. This prospect of an ageing population has caused alarm in some quarters. It has led to fears that the ageing population will threaten the future living standards of Australians. To meet this apparent threat, some have called for measures that are claimed to raise fertility and others have called for a higher rate of immigration.

It seems very likely that fertility will fall in the near future. Peter McDonald of the ANU argues that to predict a fall in the fertility rate in Australia to 1.65 in the next decade, from its current rate of 1.75, seems justified. Thereafter the fertility rate could fall further. In some countries, such as Italy and Germany, fertility rates have fallen to 1.3. Perhaps a similar low rate is in store for Australia.

The future course of immigration into Australia is more uncertain. Currently immigration is a major national issue. For over a decade the rate of immigration has been an important factor in federal and state politics. More recently the refugee issue has become an important topic, with many in the community appearing to fear a massive influx of refugees. The outcome of these debates could be a reduction in the immigration quota. On the other hand, there are pressures for increased immigration. Influential groups, such as the Business Council of Australia, are advocating on economic grounds a higher rate of immigration. Furthermore humanitarian pressures and the demand for access to Australia by potential immigrants may cause the rate of

immigration to be increased. On balance the rate of immigration in the future could go either way.

Our research addresses the central issue of this conference – the living standards of Australian residents in the future. Our particular focus is to calculate the impact of prospective demographic change for future living standards. The results of this research suggest that over the next 50 years living standards will almost double. Furthermore, our results challenge the view that low fertility will be a threat to future living standards. We find that lower fertility actually raises future living standards, although by a very small amount. Our research also shows that living standards are not strongly affected by the rate of immigration. Higher immigration increases future living standards, although by a very small amount. So the effect of fertility and immigration on living standards is best described as slight.

A crucial feature of our research is that we move beyond demography and demographic ratios by using economic analysis to look directly at living standards. In doing this we find that the demographic ratios are misleading. Economic analysis reveals some subtle effects that change radically one's interpretation of the implications of low fertility and changes in the rate of immigration.

Economic modelling of future demographics

For economic welfare, demographic measures are not of intrinsic interest. Their use is due to the belief that they give insight into the effect of demographic change on living standards. Obviously to look at living standards directly is a better approach, especially because it emerges that the demographic approach is misleading. To directly calculate future living standards we proceed as follows.

We define living standards as consumption per person. (As described below, "persons" are defined to take into account the relatively high consumption demands of old people). To calculate how consumption per person will change in the future and to assess how different assumptions about the future demographic profile will affect consumption per person we use an economic model of the Australian economy that embodies changes in the demographic structure.

In our model, the total level of output available for Australian residents to consume, that is consumption, is determined by the total level of output produced less any output used for investment purposes and any output used to make payments to foreigners. The level of output produced is determined by projections of the level of

employment and the capital stock. From demographic projections of the working age population and from assumptions about the future pattern of employment participation of age and gender groups, the future pattern of employment can be projected. The future capital stock is determined by investment.

By subtracting from output investment and payments to foreigners, we can calculate aggregate consumption.

Investment and payments to foreigners have intertemporal implications for consumption. More investment today means less output available for consumption today. The intertemporal aspect comes from the fact that investment today influences the future pattern of the capital stock. If we invest more today then the future capital stock will be larger. This implies that more output will be produced in future. Other things being equal, that is good for consumption in the future.

Similarly, if we make more payments to foreigners today, say through reducing the current account deficit, then less output will be available for consumption today. However in the future our obligations to foreigners would be lower and so more of the output produced in the future would be available for our consumption.

In converting aggregate consumption into living standards, we take into account the fact that consumption demands vary by age. Most importantly, old people have higher consumption demands. This is due to the large amount of health services consumed by old people. Our calculations suggest that a typical person 75 years or older consumes 19 per cent more than a younger adult. The higher consumption demands of old people imply that an increase in the proportion of old people will reduce the living standards supported by a given level of aggregate consumption.

In summary, our projections of future living standards take into account the future demographic structure of the economy. They recognise that some output is used to maintain and enhance the capital stock. They use production functions well established from many economic studies to convert employment and capital into output. They include the obligations of Australian residents to foreigners, that is foreign debt. They leave Australian residents at a level of wealth, defined as the capital stock minus foreign debt, in the future comparable to their levels of wealth now. And they include the high expenditures on health for old people.

Living standards in 2050

Chart 1 reports our projections of living standards for the year 2050 for Australian residents derived from our economic model briefly described above. The chart shows the increase in living standards in 2050 compared with their level in 1999.

Consider first the column labelled "Base". Base refers to a demographic projection that assumes the current value of the total fertility rate (TFR) remains unchanged in the future at 1.75 and that the annual rate of (net) immigration remains unchanged at its current rate of 0.54 per cent of population. Mortality is assumed to follow the standard ABS assumption, that is life expectancy increases by 0.4 years for every 5 years. So Base is a continuation of current demographics. Under this projection, Australia's population will increase to 28.5 million by 2050 (from 19 million in 1999).

If current demographics continue then as Chart 1 shows, living standards will be 84 per cent higher in 2050 compared with 1999. People will be almost twice as well off as they are today.

The large projected increase in living standards is driven mainly by our assumed rate of increase of labour productivity of 1.4 per cent per year. This is not an unreasonable projection. It is equal to Australia's experience over the last 80 years. It is comparable to other high-income countries. There is no compelling reason to expect a growth slowdown.

As we explained above, our projections allow for the increasing proportion of old people in the future. Above the columns in Chart 1 we record for 2050 the number of people 65 years or older per 100 people of working age (that is 20 to 64 years). For the Base case there will be 40 old people per 100 working age people. This is double the number now.

This increase in the proportion of old people does have a negative impact on living standards. This can be seen from the column labelled "No ageing". For this projection we assumed that the age structure is unchanged in the future. This is not a real possibility of course. We use it to measure the effect of ageing. If the age structure could be magically frozen at its 1999 composition then by 2050 living standards are projected to be 107 per cent higher. So there would be an extra 23 per cent on living standards if ageing did not occur.

Some people may be tempted to argue that foregoing an extra 23 per cent in living standards in 50 years time is a problem. However, this "problem" will be "suffered" by people who will be almost twice as well off as we are. This sounds a bit

like people in Greece worrying about how to increase the living standards of people in the United States.

The other two columns in Chart 1 show how our projections of living standards would be affected by low fertility and low immigration. The column labelled "Low fertility" is based on a demographic projection in which the TFR falls to 1.3 by 2009, at which level it remains. This is a considerable fall compared with the current rate of 1.75 but is not outside the experience of high income countries. Immigration and life expectancy are assumed unchanged from the Base case. The low fertility projection generates a population in 2050 of 24 million.

Using the demographic future implied by the low fertility projection we find that living standards will be 89 per cent higher than their level in 1999. Thus low fertility actually increases living standards, but the increase is very small. It would be better to conclude that living standards are independent of fertility, at least for TFR's in the range of values we consider.[1]

The fourth column, labelled "Zero immigration", shows the projection of living standards for 2050 based on a complete cessation, in net terms, of immigration into Australia from 1999 onwards. Fertility and life expectancy are as in the Base case. The implied population for Australia for 2050 under the zero immigration assumption is 9 million.

Using the demographic future implied by the zero immigration projection we find that living standards will be 78 per cent higher than their level in 1999. Thus zero immigration is bad for living standards, but not very bad. Bear in mind that a drop to zero is a massive change. Given the massive size of this change, the sensible conclusion is that living standards are independent of the rate of immigration.

We infer from our projections and the behaviour of our model that an increase in the rate of immigration above the current rate of 0.54 per cent of population would lead to slightly higher living standards in future. Again we emphasise the smallness of this effect and our interpretation that living standards are essentially independent of the rate of immigration.

The misleading guidance given by demographic indicators

[1] If the TFR falls even lower to 1 then we project living standards in 2050 to be 96 per cent above their 1999 level.

Our projections of future living standards make clear that the large rise in the number of old people per people of working age from 1999 to 2050 gives poor guidance for the impact of demographic change on living standards. Many people have reacted with surprise that living standards can grow so much. Their surprise is probably a result of the alarm spread by commentators who rely on demographic indicators alone.

The unreliability of demographic indicators can be seen by comparing the projected levels of living standards with the associated projected levels of dependency. The figure above the column labelled low fertility shows that for the low fertility case there are projected for 2050 to be 46 people aged 65 years or more for every 100 people of working age. Thus for the low fertility case, old dependency is projected to be greater than for the base case. But living standards will be higher. The relation is the opposite from the one casually assumed by many. For the zero immigration case the increase in old dependency over the base case is projected to be even greater than for the low fertility case. The zero immigration case projects for 2050 51 people aged 65 years or more for every 100 people of working age. But in this case living standards are not as high as in the base case. Clearly there is no simple relation between old dependency and living standards. Instead there can be substantial variation in the old dependency with effectively no variation in living standards.

The lack of an informative relation between old age dependency and living standards suggests that the debate should focus on the latter, not the former.

The optimum population size

Within the living standards framework of our work, the optimum population size would be that which maximises living standards.[2] Can Chart 1 give us guidance on the optimum population for 2050? Ignoring the "No ageing" column in Chart 1, because it is based on an artificial projection that could never exist, the other three columns show a clear hump shape. The highest living standards for 2050 come from the low fertility case. So, amongst these three alternatives, low fertility generates the optimum population.

However this interpretation of Chart 1 is not the one we favour. Instead what is striking about these three columns in Chart 1 is how flat is the surface defined by their

[2] Of course, given that under most scenarios population is changing over time, the optimum population is usually changing over time.

peaks. That is the interpretation we emphasised above. What that interpretation suggests is that, using living standards as defined by us as the criterion, there is not for practical purposes an optimum population. One cannot derive a meaningful target population.

Why do fertility rates and immigration rates have a negligible effect on living standards?

The negligible impact of demographic variables on living standards is due to some subtle economic mechanisms associated with demographic change. These economic mechanisms appear to be little understood by commentators in the population debate. There are two "consumption dividends" to be reaped from the prospective demographic change that Australia will experience. One is generated by the lower investment requirements from low employment growth. A second is generated by a decreasing proportion of children. These dividends enable living standards to be enhanced, thereby offsetting the demographic effect of more old people to support.

Lower employment growth implies reduced investment requirements. For example, fewer workers in the office implies fewer PCs, fewer desks and fewer office buildings. This means that more of national output is available for consumption, rather than investment. This boosts living standards. Reduced fertility implies fewer young dependents to support. The saving in this support is available to enhance the living standards of others, either immediately or in the future through higher saving.

These two consumption dividends allow Australia to allocate more of its output to consumption. This effect is illustrated in Chart 2, in which the ratios of consumption to GDP generated by the three demographic cases are shown. Compare Base with the zero immigration projection. The consumption ratio for the latter is consistently above the consumption ratio of Base. With a smaller number of immigrants, Australia can allocate a higher proportion of its GDP to consumption. This is beneficial for living standards, offsetting the negative impact of higher old dependency.

For the low fertility projection the story is more complex. Up to the year 2035 the consumption ratio is lower for the low fertility case than for the Base case. Living standards do not suffer. Instead the consumption dividend from a decreasing proportion of children allows aggregate consumption to be lower without reducing consumption per head. After 2035 the consumption ratio generated by the low fertility

projection moves ahead of that generated by the Base case. In these years the reduced investment demands are kicking in. Chart 2 shows that this effect is strong. The consumption ratio for the low fertility case increases fairly smartly. By 2050 it is ahead by three percentage points of GDP.[3]

Questioning our assumptions

Of course there are a range of assumptions that go into the economic model that we use to calculate the impact of fertility and immigration on living standards. Most importantly, we assume that the rate of growth of labour productivity will increase at around 1.4 per cent per year. In our view this is easy to defend. It is the rate Australia has enjoyed over the last 80 years. It is commensurable with rates observed in other high-income countries. Furthermore, as one would expect on the basis of 80 years of experience and evidence from other countries, there are no credible forecasts that this growth is about to permanently stop or will even slow over the next 100 years.

We assume constant returns to scale. Some people criticise this assumption with vigour, although in different ways. Glen Withers, on one side, argues that there are increasing returns to scale. Withers (2000) cites Simon (1989) as showing that economies of scale exist in manufacturing. Also the study for Australia by Caves (1984) found evidence for economies of scale in manufacturing, up to a certain level of output. However manufacturing is a small part of the economy. Furthermore, as Caves pointed out, reducing tariffs reduces the importance of economies of scale by encouraging specialisation.

Other people see diminishing returns to scale. Environmental groups are sometimes forceful proponents of this effect. They argue that increased population causes damage to the environment. The premier of New South Wales argues that population growth causes congestion costs.

The evidence from economic studies of the aggregate economy suggests constant returns to scale, that is the mid-point of the two groups of critics. It appears that in practice for measured GDP, the economies of scale in some activities are offset by congestion costs in other activities.[4]

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[3] The increase continues for the rest of the century. By 2100 the consumption ratio for low fertility exceeds that of the Base case by eight percentage points of GDP.

[4] From an econometric test on the production function for the private sector, Otto and Voss (1994) find that constant returns to scale for the private sector cannot be ruled out.

There is a qualification to our results, the importance of which is impossible to judge. Our measure of living standards, based on measured consumption, ignores some important influences on well-being. In particular environmental deterioration is imperfectly measured, indeed often ignored, in consumption. Growth in population and in GDP may lead to further environmental deterioration. How much will depend in part on the measures used to regulate pollution, such as pollution taxes.

If the higher growth scenarios lead to increasing environmental deterioration, then our measure of living standards will overestimate the growth of economic welfare. If instead threats to the environment are controlled by effective regulation then our living standards measure would be more accurate. However, even if the degree of regulation is optimal, it could be that it implies a lower rate of productivity growth compared with the past. It may change the constant returns to scale observed in the past to diminishing returns to scale. In this instance our projections of living standards would tend to overestimate their actual growth in the future and this overestimate would be greater for the faster growing population projections.

As far as we know, there is no work to give guidance on these issues. It is the case that in the past increased environmental regulation has not led to diminishing returns being observed. In the lack of evidence to the contrary we feel that this is likely to continue into the future and thus that our projections will not be upset.

We also assume an unchanged retirement age and unchanged employment participation rates of men and women. However, one cannot say that these assumptions are biased in support of our conclusions. It seems likely the retirement age and labour force participation rates, especially of women and especially if the birth rate falls further, will increase instead of decrease. This would increase output and thus living standards.

On balance we feel that our assumptions are conservative, and in that respect underestimate the future increase in living standards. They may also underestimate the gains from low fertility.

Government outlays

Our work clearly suggests that in the future, even if fertility and immigration fall, there will be enough consumption to go around to make everybody much better off than they are today. However supporting a higher proportion of old people may require an increase in government outlays as a percentage of GDP. This is because a

significant part of consumption by old people is supplied through government intervention. In particular health services and income support. How does this consideration affect our assessment of the impact of fertility and immigration on living standards?

Our calculations suggest that government social outlays are likely to rise from about 23% of GDP to about 31 to 33% of GDP by 2050, depending on by how much fertility falls and on the future rate of immigration. This is a substantial increase. However yet again the impact of different rates of fertility and immigration is slight. Furthermore, these increases in government social outlays are consistent with our projections of living standards. Because of productivity growth, workers can finance these transfers and, in after tax terms, still be nearly twice as well off as they are today.

One can be much less confident about the accuracy of projections of government outlays than about projections of living standards. Government outlays are influenced by changes in government policy. Many commentators have observed that the link between government outlays and demographic changes is weak.

It might be argued that the uncertain nature of future projections of government outlays implies they are a serious problem. But this does not follow. A better interpretation is that projecting future government outlays on the basis of current policy is analogous to Club of Rome projections of natural resource shortages. For example Hurd (1997) has projected, on the basis of past trends, a level of health expenditures in GDP of between 30 and 40 per cent in 25 years time. But if people are not prepared to finance these huge amounts then they will not happen. Government policy will adjust to what people will be prepared to finance.

The projections of government social outlays we referred to above imply, due to productivity growth, much higher levels of services. For example, should, as seems reasonable, the health sector enjoy the same growth in labour productivity as the rest of the economy then these projections embody an increase in health services per person, including health services received by old people, of about 85 per cent compared to today. If health expenditures increased to Hurd-like levels then the level of services per person would be three or four times greater. It would be a problem of abundance!

Conclusion

This conference is attempting to contribute to the development of policies to generate higher living standards in the future for Australian residents. Our research

calculates under various assumptions the future level of living standards. It shows that there will be a substantial increase in living standards in the future, almost doubling in the next 50 years. Australian residents will be much better off in the future than we are today. Furthermore, future living standards are more or less independent of rates of fertility and rates of immigration. Lower fertility and higher immigration have slight positive effects on living standards but the effects are so small that we feel the best way to describe the relation is independence.

These results will no doubt surprise many people. It is true that demographic ratios will change. The demographic projections on which our conclusions about living standards are based have the ratio of old people to working age people increasing by large amounts, by 150 per cent in one case. However there are economic mechanisms that offset the increase in old dependency. These are the consumption dividends arising from reduced investment requirements and reduced youth dependency. These consumption dividends will allow Australia in the future to operate with a higher aggregate consumption to GDP ratio. Through this living standards can be protected.

Because of these consumption dividends, the growth in the future of living standards is comparable to the growth witnessed in the past. From 1971 to 1999 living standards increased by 68 per cent. This is a slightly higher rate of growth than that which we can expect in the future, because of the turnaround in demographic trends.

In considering the policy agenda for the future, an important lesson to be learned from the past is that decisions by Australian residents in the past have led to a healthy growth in living standards. From this one can conclude that no radical changes in policy in the future are required to ensure that living standards continue to grow. If we carry on as we have been doing, then living standards will continue to grow. Our finding that decreases in fertility or changes in rates of immigration will have an essentially zero impact on living standards reinforces this conclusion. There is no intertemporal crisis to address.

Some commentators have suggested that family friendly policies be extended using the argument that these policies will raise the rate of fertility and thus improve future living standards. Our research shows that this argument is not relevant for the reason that increasing fertility will not improve future living standards.

There may be good reasons for the extension of family friendly policies. Raising the fertility rate to improve future living standards is not one of them. From this it follows that the success of family friendly policies should not be judged by

whether they raise the fertility rate. It should be judged by their record in vindicating these other reasons put forward for them, whatever they may be.

For immigration, our calculations of living standards ignore an important factor. Many immigrants gain considerably by coming to Australia. Some gain from a large rise in living standards as they move from the lower level of their pre-immigrant experience to the higher levels enjoyed in Australia. In addition, for some immigrants there are substantial benefits from moving to a country with a stable democracy and a rule of law. To add in these gains would boost considerably the benefits from higher immigration relative to the levels that we calculate.

The calculations in this article are reported in detail in R.S.Guest and I.M.McDonald, "Ageing, Optimal national saving and future living standards in Australia", Economic Record, June 2001, pp. 117-34. and R.S.Guest and I.M.McDonald, "Would a decrease in fertility be a threat to living standards in Australia", Australian Economic Review, March, 2002. For other of our papers on demographic change and living standards, go to http://melbecon.unimelb.edu.au/staffprofile/imcdonald/home.html
and look under "Consumption Balance".

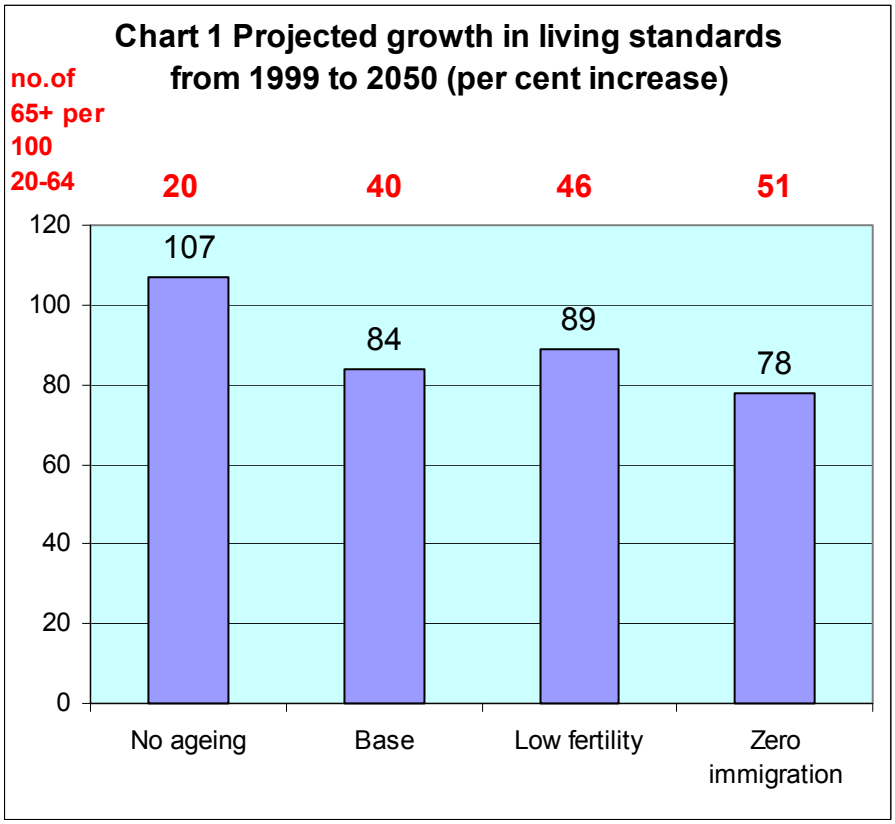
Chart 1 Projected growth in living standards from 1999 to 2050 (per cent increase)
no.of 65+ per 100 20-64
20
40
46
51
120
100
80
60
40
20
0
107
84
89
78
No ageing
Base
Low fertility
Zero immigration

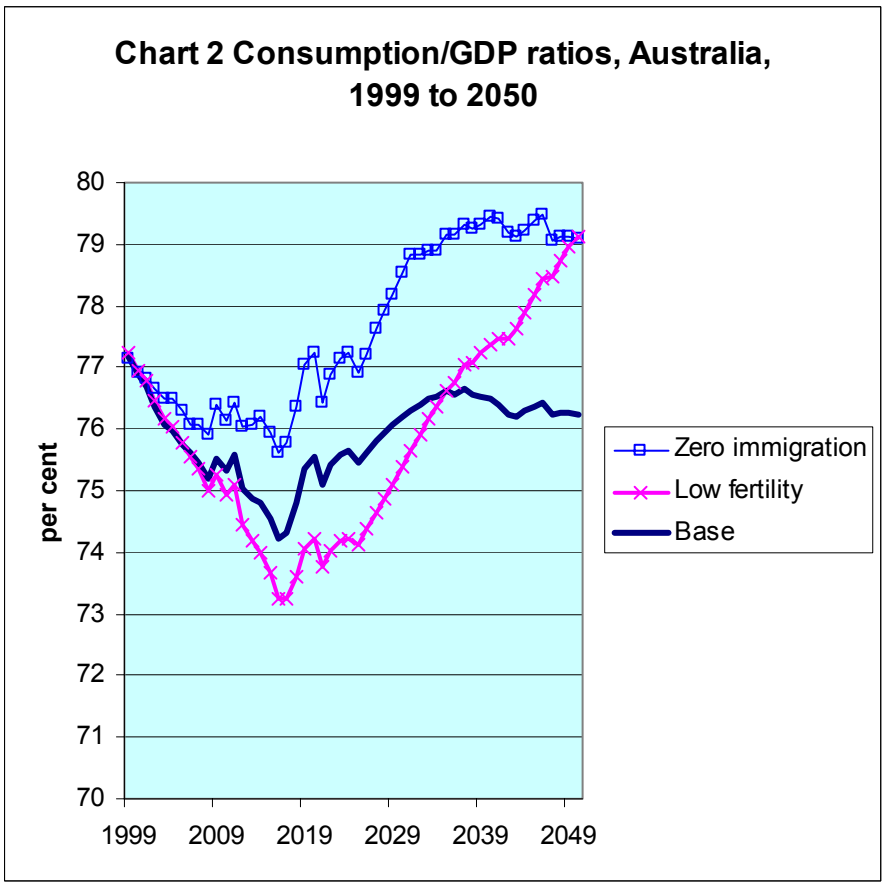
Chart 2 Consumption/GDP ratios, Australia, 1999 to 2050
per cent
80
79
78
77
76
75
74
73
72
71
70
1999
2009
2019
2029
2039
2049
Zero immigration
Low fertility
Base

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