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The impossibility of pensions

Can society support a retired population in the style to which it aspires?

In summary

In this paper, we take a step back from the sophisticated asset-liability models and actuarial calculations used for individual asset pools and use some simple calculations to observe the 'pension problem' from a macro-economic perspective. The current consensus, among the practitioners if not the general population, is that people must save more for their retirement unless they are willing to work until they are very old. While a sensible course of action for an individual, can this be done in aggregate? The title of the paper suggests that we are sceptical.

A very simple model

We will assume a closed system, such as the world, so that we do not have to worry about flows in or out. We will further assume that individuals set aside 10% of each year's earnings to fund their future retirement, and that they can earn a real return on their investments of 3.5% each year (on average). The 3.5% real return assumption has a couple of neat properties. First, it will double the value of the savings over a period of 20 years (and so quadruple them over 40 years) and, second, it would strike most practitioners as 'reasonable' for a mix of equities and bonds, and therefore not unduly aggressive. We will discuss whether we think it is reasonable in a subsequent paper. How reasonable is saving 10% of earnings? The average household savings rate for Organisation for Economic Co-operation and Development (OECD) countries is around 6%.[1] It is not easy to know how to react to this figure. On the one hand it offsets positive contributions from savers with pensions paid out, so it is possible that contributions are already at 10% of income. On the other hand, households save for many other reasons and so the figure could be disappointingly low. We will see later that we suspect the latter position is closer to the truth.

Our model requires three further assumptions: how much income people will require, or desire, in retirement, what happens to real earnings over their working lifetime, and how the accumulated pension wealth is converted into pension income. For the first we assume a 'replacement ratio' of 50%. In other words, the annual income in retirement is half of what individuals earned while working. It is clearly possible to flex this assumption, and we will, but we have opted to start here on the grounds that it is within sight of the historical 66% replacement ratio targeted by defined benefit pensions; it should allow pensioners in countries without a state pension to at least feed themselves (for countries with a state pension, the effective replacement ratio for the lowest paid increases to a much higher level); and for higher earners 50% of a very large salary still translates into a comfortable existence.

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As for the progress of real earnings we assume a 0% growth rate. So, adjusted for inflation, an individual's earnings show no increase from starting work to retirement. We will quickly concede that this is not a reasonable assumption – the majority of historical data suggest that real earnings do increase by a positive amount over time. However, we are comfortable making this assumption on two grounds: (1) some data is now emerging that shows blue-collar workers in the USA have seen no real increase in their standard of living over the last 20 years or so, and (2) assuming a positive growth rate will make the pension provision problem harder – we will have to fund 50% of a higher number for each year of retirement.

The final assumption concerns the conversion of the accumulated pension wealth into income. Here again, we assume no further real growth. So whether the actual mechanism is the purchase of annuity from an insurance company, or drawing down capital, the effective model is a process of paying 10% of current salary (and growing it at 3.5% pa real) until retirement and then drawing a retirement 'salary' of 50% of final earnings, with neither the income nor capital pot increasing in real terms after retirement. Overly simplistic? Possibly. Fit for our current purpose? We think so.

The results

There is good news and bad news. The good news is that an individual can indeed defer 10% of current earnings and draw a pension of 50% of earnings. Our simple model shows that if they start saving 10% of their earnings at the age of 20, and do this for 45 years, then not only can they fund 15 years of retirement, but they can also leave a bequest amounting to around three years' earnings. Alternatively they could 'decide' to live until 86 and leave no bequest. If they live beyond 86, then they will become dependent on alternative income sources, such as the state or their family.

Now clearly all of our assumptions can be flexed. It is straightforward to see that if we delay the start of saving, our pension pot will be smaller. The pot will also be smaller if we save less, or secure a lower investment return. In terms of our individual, in order to still retire at 65 and fund 15 years of retirement (but leave no bequest) they could (a) delay saving until they are 27, or (b) save 9% of earnings, or (c) tolerate a real investment return as low as 2.2% pa (real). Of course, in the real world of defined contribution pensions the replacement ratio turns out to be the residual of the process. So let us really stress the system and see what happens if all three 'shocks' happen at once (start saving 9%, at 27, returns of 2.2% pa). In this case our replacement ratio falls from 50% to 34%. Not pleasant, but arguably not a disaster.

So what is the bad news? An obvious comment is that, in finessing the assumptions of our simple model, we have left ourselves no contingency for living longer than expected. However, the more important consideration is whether this level of saving is possible. So let's go back to our original assumptions which gave the individual some contingency (leaving a bequest, or six extra years pension to cover living longer). This implies an individual will build up a savings pot (pensions or other sources of income for use in retirement) of just over 10x annual earnings at the point of retirement. If we now distribute our population evenly across ages[2], the economy needs to accumulate (and maintain) pension wealth equal to 4.7x total earnings. As employee compensation accounts for around 50% of GDP[3] this means accumulating pension wealth of around 235% of GDP. And this is the problem. Or, rather, this is likely to be a problem. Currently, the 11 largest pension markets in the world have pension assets amounting to 72% of GDP[4] (and the ratio has wobbled around this level for the last 10 years). While this figure does not include non-pension savings that could be used in retirement, it does reflect a significant under-provision of resources available to support pensions. Significantly increasing the amount of pension wealth relative to GDP will certainly not be easy, and is likely to entail consequences that we cannot completely foresee.

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Conclusions

So either the consensus is correct, and the world has chronically under-saved for retirement and needs to up its game, or the world is in some kind of equilibrium. The equilibrium could be because the necessary saving is already occurring outside the pension system, in which case increasing pension wealth is unnecessary. Or the equilibrium is because we are at the limit of how much of current income can be saved, in which case increasing pension wealth is not possible.

If the answer is chronic under-saving, we need to ask whether it is possible to approximately treble the amount of invested pension wealth, without reducing the rate of return on those investments.

There are numerous questions relating to a potential macro consistent constraint. For us the key question is whether it is possible to grow savings at 3.5% real for multiple decades? Or, paraphrasing, is it actually possible for society to defer consumption in sufficient size to give people the retirement they appear to expect? We will return to this important question in a later paper.

As for the alternative, that the world has found some form of pension saving equilibrium, that would imply a sustainable pension saving rate of 3.3% of earnings, which would allow a 15-year drawdown of slightly less than 25% of earnings (or a bit more than 15% if allowing a six-year contingency). So in either event we believe that society will struggle to support a retired population in the style to which it aspires.

Thinking Ahead

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1 The average rate for those countries that report a net savings rate was as low as 3.9% in 2006 and as high as 6.9% in 2009. The rate is forecast to be 6.3% out to 2013. oecd-ilibrary.org/economics/household-saving-rates-forecasts_2074384x-table7.

2 As not everyone lives to 80 and then dies, this assumption is clearly unreasonable for older ages. However, our judgement is that a more sophisticated assumption would not give a materially different result.

3 We have looked at data for selected OECD countries, hence a more developed country bias. The values for the countries we considered ranged from 40% of GDP for Chile to 55% of GDP for the USA.

4 Towers Watson Global Pension Assets Study 2012.

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