THE YOUNG HELD TO RANSOM – A PUBLIC CHOICE ANALYSIS OF THE UK STATE PENSION SYSTEM

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As populations age, it will become increasingly difficult to reform state pension systems. Reform will not be impossible, but the process of 'buying off' interest groups will be expensive. State pension provision must use the contributory principle combined with an accruals system – though private pension provision would be better still. There are serious flaws in the so-called 'citizens pension' much promoted by interest groups in the UK.

Introduction

Just as markets do not behave like the textbook models of perfect competition, democracies will not produce state pension systems that have the desirable attributes claimed by their proponents. This paper examines the incentives to influential groups of voters to expand state pension systems, even in situations where they destroy welfare. We begin by stating briefly the basic principles of public choice economics as they apply to social security systems and examine the empirical work that has already been undertaken in this area. We then look at how the voting population is likely to evolve in the UK in order to analyse the incentives that voter groups have to expand state pension provision. Finally we examine different possible structures of state pension schemes from a public choice point of view to see if there are certain types of structure that may be more impervious to voter behaviour than others.

Public choice economics and pensions

As a population ages, it is possible for a country to reach a situation where a majority of voters are above or around state pension age. At this point, the state of the political marketplace is such that beneficial reform of pension schemes may be impossible. The seminal paper on social security in a democracy was that by Browning (1975). The intuitive result is that, if the majority of voters can gain from increasing the size of the state pension system, politicians will be unable to vote to resist pressure to expand the system beyond its optimal size. Older voters are then able to increase state pension benefits whilst paying only a few years of higher contributions before their retirement and thus they will receive a high return on the additional required contributions. Any retiree who successfully votes for an increase in pensions will receive an infinite return because he has to pay no extra social security contributions to finance the pension increase. Only new voters will pay the full cost of increasing pensions as they will have to make a working lifetime of higher contributions in order to be entitled to a higher pension. In many public choice models, it can be assumed that political parties will orientate their policies to benefit the median voter. As the age of the median voter rises, the median voter will gain more from a decision to increase the size of the pension system, all other things being equal. Because the interests of pensioners are coherent – they receive a large amount of income from one source, the state – they are more likely to vote as a group for one specific objective (the transfer of income to the older generation). Most other voter groups, including those who suffer from the tax implications of higher state pensions, have a wider range of potential interests and are less likely to vote in a co-ordinated way.[1]

It is worth noting that the public choice effects can come through different channels. Firstly, parties can move their programmes towards the preferences of the median voter. Secondly, parties can stand on very different

platforms with the party that has the platform closest to the views of the median voter winning. The first model leads to the platforms of political parties becoming increasingly similar,[2] something that seems to have happened in the UK.

Pensions systems and redistribution

The public choice analysis of pensions is complicated by the fact that most pension systems involve redistribution between individuals of different income levels as well as redistribution between generations. We shall make assumptions regarding this below. Casamatta *et al.* (2000) distinguish between Bismarckian systems that are not redistributive within generations (for example, because they provide earnings-related pensions in return for earnings-related contributions) and Beveridgean systems that imply redistribution between people on different levels of income. We will accept this distinction though it is a simplification. For example, the earnings-related part of the UK system (formerly the State Earnings Related Pension – SERPS, now the Second State Pension, S2P) involves earnings-related contributions and earnings-related benefits. Although when that system was overhauled in 2002 subtle and highly complex redistributive elements were introduced (see Booth and Cooper, 2005).

Fully-funded pension schemes can still involve income redistribution (e.g. by state subsidisation of contributions). However, in a fully funded scheme there are no incentives for *inter-generational* redistribution because voting behaviour cannot affect pension rights already accrued and any increase in pension rights must be fully paid for by the generation benefiting from them. State pension schemes based on an accruals system where what are, in effect, contractual rights are given to those who accrue benefits, have similar characteristics from a public choice perspective as a fully funded scheme. Indeed, we could say that even a state scheme based on the accruals principle was implicitly funded by government debt (see Minford, 1998) though the costs and the extent of the liabilities are normally opaque at best.

Evidence from voting behaviour

The conclusions of Casamatta *et al.* (2000) are that a social security system will be bigger if it is 'pay as you go', because of the voting behaviour of retired voters who will have a strong incentive to vote for higher pensions. It will be smaller if the taxes used to finance the system are taxes that cause significant distortions because there will be a welfare loss from increased taxes that has an impact on all groups of voters. Of course, if tax rates reach the top of the Laffer curve, even retired individuals in a pay-as-you-go system would have no incentive to vote for increased taxes to finance increased pensions as no more tax revenue could be raised by increasing tax rates.

Breyer and Craig (1997) test public choice models for 20 OECD countries over four decades. The size of public sector pension programmes grew dramatically over this period – though some programmes reduced if we measure the size of the programme as a proportion of GNP. The timing of growth in different countries' schemes was different. There was also a substantial difference between the sizes of different countries' programmes (for example, in 1985, pension spending ranged from 2.1% of GNP in Portugal to 14.5% of GNP in Austria). Breyer and Craig found a very strong relationship between median voter age and pension programme size. An increase in median voter age of one year added 0.5% to the share of GNP taken by the pensions programme. Breyer and Craig also found that, for a given age of median voter, the ratio of the retired to the working population affected pension programme size.

Cremer and Pestieau (2000) examine differences between Bismarckian systems and systems that have flat rate pensions. Interestingly, they suggest that a contributory system can set up 'entrenched interests' that are harder to overcome than other interests in a public choice model. Individuals who have accrued entitlements hold a political weight stronger than their numbers suggest. This would make general reforms of the system easier as long as they did not affect current entitlements, but changes to accrued entitlements would be harder. It may also make welfare-harming expansion of the system harder. We will use this result when discussing system design below.

Rates of return to voters from increasing pensions

The UK Basic State Pension (BSP) system offers little protection for accrued rights and therefore the scope and size of the system can be expanded and contracted by the elected government at any time. In particular, the level of pension can be changed and the method of indexation can be changed. The State Second Pension provides much stronger guarantees that past accrual will not be altered in either direction. We will therefore focus on the BSP in this article.

A sophisticated population model of the UK economy was developed that shows the anticipated numbers in different age groups in different years from 2004 to 2078. This model was then used to estimate the rate of return that different voter groups would receive from a policy decision to increase pensions, under different assumptions, until 2055. The model was based on the Government Actuary's Department (GAD) UK population projections, using 2004 as a base year.[3] The projections are based on the Registrar General's estimate of the resident population of the UK. The population includes all residents, irrespective of nationality. For each age, the starting population plus net migrants less deaths gives the number in the population, one year older, at the end of the year. To this number births are added. Age is defined as completed years at the last birthday. The number of births in the year is estimated by taking the average number of women at each single year of age during the year and multiplying by the fertility rate applicable to them during that year. The total number of births in a year is divided between the sexes in the ratio of 105 males to 100 females, in line with recent experience. Mortality is assumed to improve at 1% per annum at each age in line with GAD projections. Migration is assumed to continue at its current rate, which is derived by GAD using International Passenger Survey (IPS) as a principal source.

Rate of return projections

The population model was used to project the median age of all voters (or the age of the median voter as it would normally be

described in the public choice literature). We then examined the rate of return to the median voter from an increase in the size of the pension system at various times in the future until 2055. The increase in pensions was assumed to be financed by an increase in National Insurance contributions which contributors would have to pay until retirement age. The increased rate of National Insurance contributions can be regarded as the 'price' that voters pay for the 'benefit' of an increase in pension. The required increase was calculated using the working population projections from the population model. The rate of interest which will make the present value of the expected increase in pension equal to the present value of the expected increase in National Insurance contributions, after allowing for mortality, is then calculated for a new entrant to the workforce (assumed to be aged 18) and for a voter of median age (in other words the median voter as far as a proposal to expand the pension system is concerned).

There are several simplifying assumptions in this approach. The most important are explained here and the other assumptions are explained in the Appendix at the end of the article. It is assumed that a flat increase in pension is financed by a flat increase in National Insurance contributions (that is, neither the increase in benefit nor the increase in contribution is a percentage of earnings: the increase in contributions is, say, £500 per year rather than, say, 6% of earnings). This is not in accordance with the administrative mechanisms of the National Insurance system but is not necessarily unrealistic. The basis of our assumption is that all distributional issues are being set to one side or, equivalently, that the cross-sectional distribution of income remains unchanged. This could be achieved in the way we suggest (by fixed contribution increases paying for lump-sum pension increases). In practice, however, such a policy change that increases pensions whilst leaving the cross-sectional distribution of net income unchanged is more likely to be achieved by increasing the pension and increasing National Insurance contributions as a percentage of earnings but then making other adjustments to the tax system that returned the income distribution to its position before the increase in National Insurance contributions and pensions. This could be achieved, for example, by reducing the basic rate of income tax and not raising the basic tax allowance in line with earnings: a policy that has, in fact, been followed for most of the last 40 years.

If there were increased redistribution as well as a rise in the pension – as a result of a rise in the *percentage rate* of National Insurance contributions and a fixed rise in the basic state pension (so that better off people paid more for the same increase in pension) – then the proposal will become better value to some younger voters who are on, and expect to remain on, low earnings. In turn, it will be worse value to some older voters on higher earnings. We are simply setting such considerations to one side. Our assumption is not unrealistic, in the sense that we are denying the existence of the distributional implications of the state pension system. Rather, we are simply suggesting that voters are able to decide on a range of policy issues and that the median voter on each issue will strongly influence policy.

Table 1: Trends in the age of the median voter

Date	Projected age of median voter: no immigration	Projected age of median voter: allowing for propensity to vote	Projected age of median voter: with immigration
2005	46	50	46
2015	49	52	48
2025	52	56	49
2035	53	58	50
2045	54	59	52
2055	55	60	52

Trends in the age of the median voter

Using the population projection model it is possible to see the trends in the age of the median voter over the coming generations (Table 1). The table shows the projected age of the median voter at specimen dates over the next 60 years. It also shows the age of the median voter if reasonable assumptions are made about the propensity to vote and about immigration.

It is worth mentioning that to change this sharp upward trend in the age of the median voter, it would require a considerable rise in the birth rate very soon. Ignoring migration, the shape of the electorate until 2034 is more or less settled today. It can be seen that reasonable assumptions about immigration do prevent the age of the median voter from rising as quickly[4] (see column 4). In column 3, the age of the median voter has been recalculated using assumptions about the propensity to vote. It is assumed here that voting propensities in different age groups will be the same in the future as they were in 2005.

Once the median voter is above pension age there is a strong incentive for voters to expand the state pension system to its maximum possible size, which would occur when tax rates are at the top of the Laffer curve. Indeed, it is worthy of note that tax rates are already close to the top of the Laffer curve in many EU countries (see Smith, 2006).

The ageing of the median voter relative to state pension age can also be shown by looking at the proportion of voters aged 55 or over (that is, within ten years of current state pension age) over time. This is shown in Figure 1.
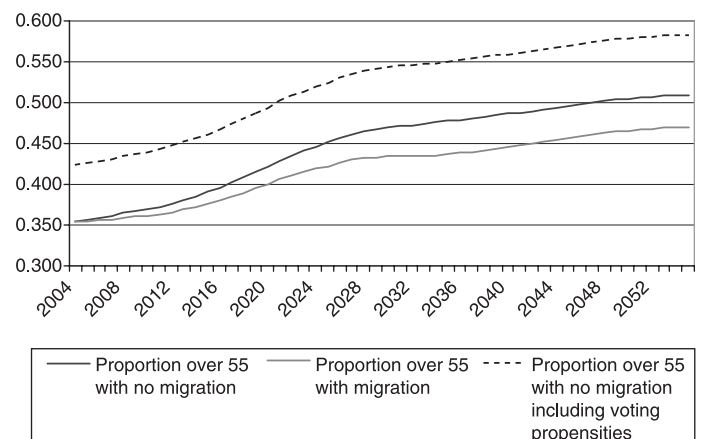

Figure 1: Proportion over 55, UK population

The proportion of the population over 55 is projected to rise to over 50% by 2050 from just 35% today. Making allowance for reasonable assumptions about future migration keeps the proportion a little lower. However, if we adjust the population projections for differential age-related turnout at general elections the expected proportion of active voters over 55 will be nearly 60% by 2055 and 50% by 2020. It is worth noting that Galasso (2006) finds very similar trends in the median voter using an independent model.

Rate of return calculations – voters of median age

Having estimated the age of the median voter for all years from 2004 to 2055, the next step is to calculate the rate of return the median voter could obtain from successfully voting to expand the pension system.[5] The rate of return from a given increase in pension, financed by the necessary increase in National Insurance contributions to finance the pension increase was calculated as follows:

- $x, date$ = the age of the median voter in year $date$;
- $l_{x+t,date+t}/l_{x,date}$ is the proportion of voters still alive t years after they reach the age of the median voter in year $date$;
- NI_{date+t} = the rate of National Insurance contributions necessary to finance the proposed pension increase (assumed to be £2,000 per year – though this is just a scaling factor; any other assumed increase would give the same result).

The real rate of return, j, to the median voter, from successfully supporting policies to raise pensions by £2,000 per year is calculated from:

$$2,000 \sum_{t=65-x}^{t=110-x} \frac{l_{x+t,date+t}}{l_{x,date}} (1+j)^{-t} - \sum_{t=0}^{t=(64-x)} NI_{date+t}$$

$$\times \frac{l_{x+t,date+t}}{l_{x,date}} (1+j)^{-t} - = 0.$$

This is simply the equation where j (the rate of return to the median voter) is allowed to vary so that the present value of expected increased National Insurance contributions from increasing the state pension is equal to the present value of the expected pension receipts. If $date$ is equal to 2009, for example, the second part of the expression would use the age of the median voter in 2009 ($x = 47$) and discount all the expected increased National Insurance contributions necessary to finance a £2,000 increase in the state pension from age 47 to age 64 ($date + t$ = 2009, 2010, 2011 and so on, $x + t$ = 47, 48, 49 etc.). The first term in the equation would then sum the present value of all the expected pension payments of £2,000 from the date at which the individual would reach 65. It is assumed that all individuals die by age 111. If the median voter is age 65 then, clearly, there are no National Insurance contributions to be made by the median voter.

Rationale

The rationale for this is straightforward. Voters in the political market can choose to maximise their financial best interests when they vote. The median voter can obtain a rate of return from saving in two ways. He can save in the financial markets and obtain a rate of return above inflation of about 1.6% from index-linked gilts (or higher returns from taking investment risks). Alternatively, the voter can act in the political market and obtain a rate of return on increased National Insurance contributions in the form of a higher state pension. Neither of these options is risk free, though the risks attached to each are different.[6] The above equation allows us to compute the rate of return to a voter from a decision to increase National Insurance contributions. If this is more profitable to the median voter than saving through financial markets, one can expect the median voter to have a preference for raising his pension by voting for higher pensions in the political marketplace.

The rate of return to the median voter from increased state pensions increases as the median voter gets older because a given pension increase will be financed by fewer years of increased National Insurance contributions for that voter. The rate of return will also be related positively to life expectancy and negatively to the increase in National Insurance contributions necessary to finance a given increase in the state pension. This will, of course, increase as the age of the median voter increases (because there will be fewer contributors per retiree), thus causing a slight offset to the tendency of the rate of return to voters to rise as the age of the median voter rises.

The results

The variation in the real rate of return to the median voter who successfully votes to increase pensions is shown in Figure 2.[7] At the current time, the rate of return is 5.8%. The rate of return will rise quickly to 7.6% by 2025 and then rise more slowly to 8.8% by 2050. This suggests very strong, and increasing, incentives for the median voter to vote to increase the size of state pensions. One would expect politicians to respond to those incentives, at least at the margin, by offering financial packages that benefit the median voter and raise the level of government help to pensioners. These packages might not necessarily directly involve raising state pensions, as other benefits may be provided to the old. On the other hand, reducing benefits to pensioners will be very difficult.

These figures can be compared with the risk-free real rate of return that the median voter can obtain from saving in financial markets – currently about 1.6% per annum. However,
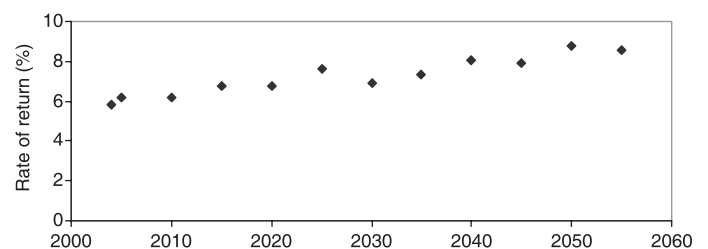

Figure 2: Rate of return from increasing pension (%) (median voter)

this comparison is not straightforward (see Galasso, 2006 and footnote 6 above). The return from the median voter voting for a higher pension is not risk free. Future generations of voters could take the increased pension away. Indeed, the median voter could pay the higher contributions and then find that, because of fiscal constraints, future electorates decide that he does not receive a higher pension at all – and thus he could receive a return on his contributions of −100%. However, the control of the electoral system by the median voter reduces this risk. Secondly, we have not used a general equilibrium model and thus we have ignored the effect of increases in labour taxes on labour supply. If the labour participation rate falls as National Insurance contributions rise, a larger increase in National Insurance contributions will be necessary to finance a given increase in pensions. In the limit, the median voter clearly does not have an incentive to take tax rates beyond the top of the Laffer curve, where increases in tax rates will lead to lower tax revenue. If this were to happen increases in taxes cannot effectively finance an increase in the level of state pensions although older voters could still vote for a transfer of government spending from spending oriented on the young to spending oriented on the old.

Rate of return from increasing pensions – new voters

A new voter will have to pay increased contributions all his life in return for an increased pension at retirement. Therefore the new voter faces both the costs and the benefits from a decision to raise the levels of pension.

The changes in the rate of return over time from new voters voting for an increase in pension are shown in Figure 3. It can be seen that there is a gradual decline in the rate of return from zero to just below −1%. If both the National Insurance increase and the pension increase were linked to increases in salaries, as in a Bismarckian system, we would find the expected real rate of return simply from adding expected salary increases to the rates of return in Figure 3. This would give rates of return approximately in line with those that can be reasonably expected from a Bismarckian pay-as-you-go system during an era of ageing population.

It is clear that new voters would gain from a contraction of the state pension system and a move towards privately funded accounts. Even if young people were to invest solely in more-or-less risk-free index-linked investment instruments they would obtain a higher rate of return than the risky rates of return that can be 'promised' through the political system.
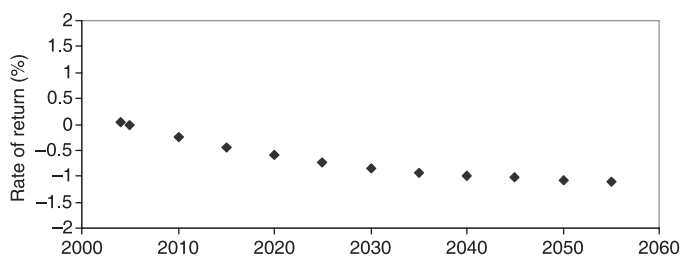

Figure 3: Rate of return from increasing pension (%) (new voter)

Political market failure

These results demonstrate a clear failure in the political market. Politicians often use private market failure as a reason for government intervention, but it is difficult to conceive of a private market that allows the most influential actors to dictate the allocation of resources whilst imposing such large external social costs on other groups of people. It should be noted that, in the case of pensions policy, many of the groups of people on whom these external costs are imposed have no influence on the political process (because they are not old enough to vote or have not even been born: see Booth, 1998, 1999; Kessler, 1996).

System design and public choice

The analysis above suggests that reform of state pensions may become impossible at the very time reform is most urgent. Reform may only be possible if the accrued rights of older voters are not reduced, in countries with a relatively young population, or in non-democracies. However, there are clearly some modest reform programmes taking place and, except in the UK, state pension systems are not continuing to expand. This may be because, in many continental European countries, taxable capacity has been reached. But, it is still worth asking whether there are design features of state pension schemes that can make them more impervious to rent seeking by voter groups.

Rent seeking and the UK state pension system

State pension schemes can be designed on an accruals basis. This would mean that, for every year of contributions,[8] a year of pension entitlement is accrued. For example, if the maximum pension required 35 years of contributions then every year of contributions would entitle the individual to 1/35th of a full pension. This is broadly the same as the methods used in both the UK Basic State Pension and Second State Pension systems. However, there are important differences between those two systems. With the Basic State Pension, the contribution record determines the proportion of the Basic State Pension that an individual receives, but the level of the Basic State Pension is then determined each year by Parliament. At various times since its inception decisions have been taken to vary the level of the pension and the basis of indexation. The Second State Pension system is based on a much more secure accruals principle. The amount of pension accrued from each year of contributions is set out in legislation and regulations and the index to which the accrued amount is linked both before and after retirement is also pre-determined. Major adjustments to pension rights that have already been accrued have not been made in the State Second Pension (S2P) system (nor in its predecessor, the State Earnings Related Pensions system) though changes to rules for future accrual have been made.

Some of these safeguards have been broken down in recent years. In particular, the introduction of S2P in 2002 made the accrual of pension more arbitrary. Nevertheless, it is still true that changes were only made in respect of future accrued pension. No generation was able to vote itself future pension

rises except in respect of pension entitlement earned by future contributions. On the other hand, changes to the Basic State Pension will shortly change the level of the pension *in respect of all years for which contributions have been made in the past*. The importance of the accruals system can easily be illustrated. Take an individual in a state pension system who accrued (say) 1/35th of a full pension in each working year and who was one year from retirement. If the electorate voted to double the level of state pension for future accrued pension and also double contributions, this individual would only receive the higher level of state pension on 1/35th of his pension. His incentive to vote for a higher pension is therefore substantially limited.

The accruals system can be reinforced by allowing people to contract out of the state system (for a refund of social security taxes to be privately invested) which also has the advantage of facilitating the privatisation of pension provision. The UK government is, in fact, moving in the other direction by restricting contracting out and using the refunds of social security taxes that would have been invested for the long term to raise current benefits. Public choice has raided the pot being set aside for the future to pay the money to today's elderly generation.

Citizens' pension

Many commentators have proposed a citizens' pension (see O'Connell, 2004, for example).[9] This is the most undesirable model from a public choice point of view. With a citizens' pension, all individuals would receive a state pension regardless of their contribution record. The pension would be set by the government of the day (or by a body set up by the government) and any increase in pension would be received by all people, regardless of their contribution record. This system is highly manipulable by the median voter. Older voters can vote for the pension to increase, without bearing any significant costs themselves.

Rather than move the Basic State Pension in the direction of a citizens' pension, it would be better to move it in the direction of the former State Earnings Related Pension Scheme. For every year of contributions (or attributed contributions) an individual could accrue an entitlement to (for example) 1/35th of a full pension, linked to an index until retirement (for example, an index of earnings or an index of prices). If the amount of the full pension were increased at any time (and National Insurance contributions were increased commensurately) it would only be accrual in respect of future years of contributions that would bring an entitlement to a higher pension. Indeed, the government could go further and turn state pension accrual into a contractual entitlement.

Is pension reform a lost cause?

Reforming state pension schemes would appear to be particularly difficult in a citizens' pension scheme or in a scheme where accrued rights are relatively insecure, such as in the UK Basic State Pension scheme. Certain types of reform do seem possible though.

Pension reform has recently been undertaken in Sweden. This is perhaps surprising given the demographic background there. In the twentieth century[10] the age of the median voter has increased by eight years to 47.5. Young people, defined as those between age 20 and 25, fell by half as a proportion of the electorate. However, a new pension system was introduced during the 1990s that reduced both costs and pension benefits. Under the new system, notional contributions are made that receive an 'interest rate' based on changes in the population of working age and changes in productivity. An annuity is then paid at retirement, calculated by taking the accumulated account and dividing by life expectancy at retirement. The new scheme reduces risks for the working population by having a built-in mechanism for reducing the level of pension as the labour supply decreases and as life expectancy increases. One would expect this to be attractive to younger people. Because the system is based so firmly on an accruals principle it will be difficult for interest groups to increase the level of pension – and any changes would only affect future accrued pensions so that the cost would be fully borne by any generation voting for it.[11]

Those aged over 57 were not affected by the change. They therefore had no incentive to vote against the proposals. Very young people had an incentive to vote for the reform as they were promised a more sustainable system with lower contributions. The voting behaviour of middle-aged groups would depend on their specific income characteristics but, overall, votes in favour of the reform would have been expected to outnumber votes against the reform (Kruse, 2005). In a public choice analysis of reforms, Kruse (2005, p. 14) says that it was such a 'smart use of the transition rules' that made reform possible.

Other pension system reforms have been achieved by removing the costs of reform from the older generation of the population entirely. For example, where Chilean-type reforms, based on compulsory personal accounts, have been implemented, older people have often been excluded from the new arrangements altogether (see Stroinski, 1998). Alternatively, the value of their rights has been crystallised in the form of 'recognition bonds'. From a public choice point of view, this was probably necessary to facilitate any type of reform. It does mean that the younger generation pay for the liabilities accrued by the older generation (which they would have had to do in any case). But, interestingly, in countries where reform has taken place, the younger generation are willing to forsake having their own pensions paid for by the generation that follows them if it facilitates reform.

Conclusion

All political parties nakedly flirt with older voters. The Conservative, Liberal Democrats and Labour parties compete with each other offering combinations of so-called winter-fuel allowances, free television licences, wage-indexing of state pensions, special tax concessions for the elderly and free bus journeys. There is no other voter group that political parties try to attract so explicitly. Given the information above about the ageing of the median voter, this is not surprising.

The ageing of the median voter in the UK makes it highly likely that state pension reforms will become more difficult, or even impossible, to implement. As such, it is essential that those elements that most nearly approximate to ensuring that a

given age group pays for the pension rights it promises to itself are strengthened. These elements include the accruals principle which should be reinforced within the Basic State Pension system. The reforms proposed in the current government's White Paper are entirely predictable in public choice theory. State pensions are going to be increased, with relatively little delay. On the other hand, there is an increase in state pension age being proposed that will not fully take effect until after the median voter has retired.

Appendix: the meaning of the rate of return

An important technical point relates to the form of the rate of return that we calculate for voters who successfully vote to expand the size of the state pension system. If we assume that there is an increase in pension that stays the same in real terms in future years then there will be a given required real increase in National Insurance contributions[12] – thus the cash increase in contributions necessary to finance the increase in pension will rise with inflation. Alternatively, there could be an increase in pension that rises in line with salary increases. That would require a rise in National Insurance contributions that stayed the same relative to salaries but again also rises as the dependency ratio rises. The numerical rates of return to voters who successfully expand the system that are calculated from the two different approaches will be the same but they will have different interpretations. In the first case, the rate of return will be a real rate of return; in the second case it will be a real return above salary increases. The point is not crucial: indeed, it is merely an illustration that the median voter can vote for policies that are substantially to their advantage. For ease of exposition, we have assumed in discussion that there is a constant real increase in pension financed by a real increase in National Insurance contributions.

1. For example, a self-employed couple with children are likely to change their voting behaviour in response to a much wider range of policy stimuli (regulation, the level of tax, education, planning and housing policy and so on).
2. This is, in effect, the original public choice model of party behaviour if it is assumed that parties shape their policies in order to attain power: see Mueller (2003) for a full discussion of the theory.
3. Full details can be found on www.gad.gov.uk.
4. This assumes that migrants can vote. In fact we have ignored migration in our rate of return calculations as they have a low propensity to vote.
5. The reader can skip the mathematics and move straight to the explanation under the sub-heading 'Rationale'.
6. For example, there is longevity risk from saving and then planning to buy an annuity at retirement – annuity rates may have become more expensive in

the time between investment and retirement. There is political risk from increasing state pensions.
7. In calculating the rates of return we have taken a conservative approach by not adjusting the age profile of the electorate for the variation in the propensity to vote at different ages.
8. A contribution record can be assigned to an individual who is too poor to make contributions or who is not in paid work, as happens in both the UK Basic State Pension and Second State Pension systems, without any loss of the advantages of this system.
9. The National Association of Pension Funds (NAPF) also promoted this.
10. The state pension system was established at the beginning of the twentieth century.
11. This would not, of course, stop older voters supporting other mechanisms for increasing the proportion of government spending directed towards the elderly.
12. Ignoring any increases arising from a rise in the dependency ratio.

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