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The economic consequences of ageing populations

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SUMMARY

The effect of low birth rates and lengthening lives on the economy is discussed. Two extreme cases are examined: where pensions are entirely on a pay-as-you-go basis, and where they are entirely funded. It is argued that the economy would grow faster in the latter case. The impact on the levels of consumption of each age cohort during its lifetime is assessed. The possible magnitude of changes in consumption as a result of an increase in the retired part of the population is illustrated. It is shown that, comparing later cohorts to earlier cohorts, the former are better off under a funded system. An argument is then sketched showing that a pay-as-you-go system favours earlier cohorts too much; while most probably, but not certainly, a fully funded system favours the later cohorts excessively. It is claimed that a gradual introduction of partial funding, and some increase in the length of working lives, can deal with the effects of an ageing population without an excessive burden on any cohort or age-group.

1. INTRODUCTION

When people talk about the economic problem of an ageing population they are contemplating a period in which the proportion of workers in the population will be substantially lower than it used to be. The common fear is that the sustenance and care of the elderly will become an increasing and eventually a heavy burden on the 'productive' members of society. In the public finances of many economies, European and other (World Bank 1994), the apparent problem takes the form of projections of strongly rising contributions to the social security system.

I shall argue that the severity of the problem is overestimated, and may not be properly regarded as a problem at all. It really resolves itself into an issue about distribution among generations, on which there is some room for difference of opinion as to what is best to do. The extent to which provision for public pensions is funded in advance brings about a particular distribution of economic resources between present and future generations. It can be argued that there is, in many countries, too little funding; but full funding is probably going much too far. There is time gradually to increase funding to the extent that is reasonably required.

2. CHANGING DEMOGRAPHY AND CHANGING EMPLOYMENT

Three different things have been happening, in varying degrees, in the richer economies. People are living longer; they are having fewer children; and fewer men of working age are working. We may accept that the increasing length of life is a secular trend. If workers continue to retire at the same age, that means

an increasing proportion of the population will be consuming but no longer contributing to production. A lower birth rate is not necessarily a permanent fact. In some of the northern European countries the birth rate is above the replacement rate. Where and while it continues to be low, population will decline, first the working population, then the retired.

Increased unemployment may seem to exacerbate the problem, though falling male labour-force participation has been offset to a considerable extent by increase female participation. Less work is done at home by people: capital does more, just as in the market economy. The persistence of relatively high unemployment rates is now often seen as evidence that new technologies have somehow permanently reduced the demand for labour; and it is believed that we cannot therefore expect people to continue working to a greater retirement age than in the past. But the demand for labour is highly dependent on the cost of labour to employers (and also on the level of commodity demand which has often been kept low to create unemployment as a control on inflation). It is erroneous to regard the demand for labour as technologically determined. In fact economies appear to accommodate considerable variations in the rate of growth or decline of the labour force, while the unemployment rate (low or high) persists. Longer working lives could perfectly well be used even in developed economies.

Experience in the US, for example, seems to confirm what one would expect, that the age of retirement is strongly influenced by the fiscal structure, by the incentives implicit in social security rules. (Some of the evidence is summarized in Wise (1996).) As people live longer, and remain healthy to a greater age, we should expect them to choose to work longer. At least there is

no good reason to artificially encourage them to stop working at 65 or less by substantially reducing the net benefit from working at that age. People who wish to plan for early retirement need not be discouraged from doing so, but they should make suitable provision for the pension they will want to have when they do retire. Currently, in many countries, the fiscal system provides too great an incentive to leave the labour force at an age that is early relative to increasing life expectancy. As people stay healthier longer, and work in ways that are physically less demanding, one would expect most of them to want to go on working longer than their parents did. In particular, with household capital (washing machines and plastic meals) doing more of the housework, as much in the seventies as in the forties, one would expect people (women mainly) to want to continue longer in paid employment.

3. RETIREMENT AND THE COST OF PENSIONS

As economies become richer it is possibly better for people to spend a smaller proportion of their lives working, particularly if they are also living longer. If, as has been true for many decades, lives are lengthening while output per working person is rising, it could be best that the extra years of life are spent doing something other than working for a wage. But it is far from obvious that this is best. The question is, what would people want to do, given a realistic trade-off between consumption and the length of the working life? The evidence is somewhat mixed, but mainly suggests that a lengthening working life is better. Comparing people with higher and lower wage incomes, on average higher wage people retire later. It is true that, as shown by the Black Report (Townsend & Davidson 1982), disability and even mortality is higher among low-wage people. It may be that their observed preference for a shorter working life is more of a necessity than a preference; or at least a preference induced by differences in health and capability. These changes in health and capability are also happening over time, not only through improvements in public health and medical care, but because of immense changes in the kinds of jobs people are doing, driving lorries and pounding keyboards instead of mining coal and carrying bricks.

If working lives should be lengthening, and I believe they should, that changes estimates of the cost of providing for future pensions; but not by an immense amount. By delaying retirement, people will earn a greater pension once they do retire. And to encourage later retirement, fiscal changes may and should partly take the form of reduced pension contributions at higher ages. But, on the grounds that people can well work longer, we can arrange that the pension payable at, say, 65 will in future, and to an increasing extent, be lower relative to the general level of incomes. To earn a 'normal' pension, people may have to continue work till seventy. On that basis, assuming no immense increase in disability pensions, the cost of pensions could be substantially less than is currently predicted.

Governments who are contemplating state pensions increasing at a lower rate than average incomes may not have in mind a compensating change in the average retirement age; but it would be a reasonable and natural response. It is important that pension entitlement does increase appropriately with delay in taking it up.

Therefore, even while the demographic structure is changing as it is, there might be no substantial decline in the proportion of the population who are in the labour force. But, in practice, there probably will be. From now on, I examine the consequences if people were not to adjust the lengths of their working lives, and the age structure changes so that, temporarily or permanently, the proportion of the population who work falls substantially.

4. PENSIONS AND SAVINGS

The implications of such a decline depend very much on whether pensions are funded or not; that is to say on the extent to which pensions are paid for with the return on savings made earlier when the pensioners were working. In a pay-as-you-go system, the consumption of retired people is provided by the payments of contemporary working people. In a fully funded system, the pension contributions made by working people are invested, and when they receive pensions they are paid for entirely by the return from that investment. In the latter case, there is a question how the system deals with uncertainty. Returns to investment are uncertain, no matter how much the investments are diversified around the world economy. Insurance companies and pension funds deal with this routinely, and on average make quite a nice profit to compensate for the risk they take. A state system can do things somewhat differently, and perhaps better. But this question of uncertainty is a side issue, and I shall discuss the funding issue as though everything were certain.

It must be emphasized that there is no country where all pensions are provided in a pay-as-you-go way. The state pension is never universal. Many who receive the state pension also have a funded pension, provided by employers or from a private contract, and they have income, including annuities, from their own saving. In the UK now, funded pension income is probably greater than unfunded pension income.

The economic theory that provides the most helpful way of thinking about these matters is the life-cycle theory of saving. It sees savings in the economy as the sum of individual decisions, to save when it is desired to postpone consuming income until later in life, and to dissave when that postponed consumption is done. The logic of the theory lets us think about the consequences of different pension systems, and the impact of demographic changes. In its simplest form, the theory supposes that people save to provide for their own future consumption, particularly in retirement; but where there are taxes (such as state pension contributions) and pension rights, the theory is readily modified and the same principles apply. The theory can also be modified to allow for inheritance and bequests, but its main

thrust is the idea that private saving is postponed consumption rather than something that is done spontaneously by a special class of capitalists.

It must be said that the theory does not satisfactorily account for some aspects of people's actual saving behaviour, particularly the widely observed facts that many people have little saving when they retire, and that many of those who do have saving, continue to save during retirement (see, for instance, Disney 1996). Presumably these phenomena relate partly to uncertainties and the imperfections of the capital market, and partly to the existence of other sources of consumption, such as welfare systems and support by children. The theory nevertheless is a very suitable vehicle for analysing the broad features of pension systems.

5. PAYING AS YOU GO

According to the life-cycle theory, there would be no saving in a country with a perfect pay-as-you-go system, since the consumption that people would want to have in retirement is then provided by the system. If no saving, then there is probably not much economic growth. Something similar would be true in what we might call an altruistic country, where working children provide fully for retired parents. This theoretical model corresponds to the law in China, where nevertheless saving is remarkably high—gross national saving is reported as 42% in 1995 (World Bank 1997, table 13, p. 238); and to the religious norm at least of Islam.

Theoretically, if children are known to be altruistic towards their parents, the parents have no incentive to save when working, and the outcome is the same as in a pay-as-you-go system. The systems would in fact be rather different because of imperfect matching between parents and children. Also the actual level of retirement consumption could be different. In what I called a perfect pay-as-you-go system, the pension is supposed to be what people would want if they could provide for their pension by saving. In the altruistic society, it is what their children give them, and that might be more or less than they would have chosen for themselves.

In actual pay-as-you-go systems, many people supplement the state pension, through a pension scheme arranged by the employer, or independently. These supplementary pensions are funded, since they are provided by the savings of individuals. It is also saving if the employer happens to pay the requisite contribution direct to the pension fund, for that payment is really part of the employee's wage income. The extent to which pensions are funded varies considerably from country to country. The UK is relatively extreme, with the state providing little more than a basic pension and only a small earnings-related element. In countries where the state system provides most of people's pensions, without funding, the situation is very similar to a society in which working children provide for their non-working parents' consumption.

According to the life-cycle account of saving, there would be large consequences from a completely pay-

as-you-go pensions system. In the theoretically perfect pay-as-you-go society, there would be no reason for people to save, and, with little saving, there would be little capital. Then output at any time would depend simply on the size of the working population at that time. In a year when there are fewer workers and more retired people, output will be less, and average consumption less.

Just within the year, one might say that people, workers and retired, are worse off than if they were living in a society with a higher proportion of the population working. It is not quite so easy to judge the effect on well-being. If this change in the proportion of workers has come about because people are living longer, the longer life may well be compensation for lower annual consumption. It may, of course, be the result of a low birth rate leading to a declining population; in which case people are indeed worse off than they would have been if population had been constant or rising (and if average productivity were not less as a consequence).

In any case, the question, are people worse off than they would have been if the proportion of people of working age had been greater, is not the right question. The suggestion apparently implicit in talk of a social-security crisis is that payments to the retired will have to be reduced drastically. In the altruistic society, they would indeed be reduced, but not to more than the after-contribution income of the workers. Taking an artificially simple view (ignoring children, for example), one could imagine that workers and retired are identical, and enjoy consumption the same way whether they are working or not. Then under complete altruism, workers will give enough to non-workers to ensure that all enjoy the same level of consumption. The average worker's contribution for the consumption of the retired will be the same proportion of what he produces as the retired are in the population of workers and retired. If there are more retired, the contribution proportion is greater. That is not regrettable.

No doubt this picture exaggerates the extent of altruism, but even with partial altruism the same general principle operates. If in years when workers are a large part of the population, pension payments are designed to make pensioner consumption three quarters of worker consumption, then one would expect more or less the same ratio to apply in years when workers are a lower proportion of the population. When workers are three-quarters of the population, the contributions required to pay for pensions are 20% of the gross wage. When workers are half the population, the contributions required are 43% of the gross wage. In the latter case, the pension, and a worker's consumption, is 70% of what it is in the former. The consequences are large.

Possibly—indeed in an unequal society, certainly—the higher proportionate contribution will have an adverse effect on labour incentives, so that production will be reduced. In an altruistic society, there is nothing one can do about that. In a pay-as-you-go system, it is a reason for setting the pension level and contributions in such a way that there is a higher differential between workers and retired, with workers enjoying higher consumption than retired.

In passing, we should note that this is not an argument that the pay-as-you-go system is necessarily worse for incentives, and therefore aggregate output, than a funded system. If, as in many pay-as-you-go systems, pensions are income related, there is a positive incentive effect of the system that offsets the negative effect from financing pensions by social security taxes. (Of course, this assumes that people appreciate the effect of higher earnings on future as well as present disposable income.) Whether there is an adverse incentive effect of the pay-as-you-go system depends on the relative progressivity of the social security taxes and the pension benefits. That is not necessarily different in a funded system from a pay-as-you-go system. But a change in the revenue requirement for the pay-as-you-go system, because of changing demography, would not greatly change benefit progressivity, but can have a substantial effect on tax progressivity. Even then, there need not be a reduction in incentives: that depends on how the taxes change, and is a complex issue. When social security taxes are simply proportional to wage income, and extra revenue is therefore obtained by increasing the proportional rate, there is almost surely a negative impact on incentives.

Because of the greater level of the social security tax when the ratio of retired to workers is greater, there may be grounds for having a somewhat higher differential the greater is that ratio, thereby modifying, but not greatly changing, the sorts of figures just mentioned. The conclusion is that, if the system has to be pay-as-you-go, and there is no increase in the working age, higher contributions should be accepted, and with a substantial change in the proportion of the retired, the contributions may indeed become a substantially higher proportion of wage income.

In the absence of growth, and with a rising proportion of retired, people born later will be worse off than those born earlier. When economic growth is nevertheless occurring, these later cohorts may not actually be worse off, but their consumption does not rise as rapidly as per capita output in the economy. In any case, the question is raised, whether the pay-as-you-go system is fair and right as between generations. Before addressing that issue, consider a society where pensions are fully funded.

6. FUNDED PENSIONS

Full funding of pensions is achieved when the saving (whether voluntary or compulsory) of workers has been sufficient to provide for the pensions. The savings create capital, and there is a positive rate of return available on the capital: a unit of saving in one year creates much more than a unit of output available for consumption twenty years later (more than double is realistic). This full return is not always available to private saving, and sometimes not available even to saving invested in pension funds. If the state provided a fully funded pension system, it would have workers make contributions that paid for their future pensions at that full return to capital. Alternatively, it could arrange that there is no taxation of income from capital invested for pension provision, and one might

think that would similarly create a society with full funded pensions; but in practice it seems that not everyone would make adequate provision for a pension.

Just as the pay-as-you-go system corresponds roughly to perfect altruism between generations, so the fully funded system corresponds to a society where there is no altruism, and in particular no transfers from children to parents, and there is perfect well-calculated selfishness, where each individual provides for his or her own pension.

When pensions are paid from the return to capital, there is economic growth, and output in any year depends on the amount of capital that has been created by saving as well as on the size of the labour force (and all the other things that affect output). One must issue a warning that simple models do not give a very accurate description of the relationship between output on the one hand and labour and past saving on the other. Nevertheless, it is easy to understand what happens if output is simply a function of labour and accumulated savings, i.e. capital. On standard assumptions, a reduction in labour will increase the earnings of each worker, and reduce the return to capital. The presumption that wages would be higher is probably quite robust.

Following the simple model, we can say that if there are fewer workers in some period, each worker will be better paid, and each retired person would, if it had not been foreseen, get a smaller pension. But if, more reasonably, this were foreseen, that is to say, if the return on capital will be accurately predicted, there might well have been greater saving to compensate for the reduced return to capital. That saving might or might not reduce the rate of return to capital further. In any case the pension need not be any lower, but pension contributions would in the past have been greater.

This situation corresponds to the effects of a lower birth rate, which in due course reduces the size of the labour force. Suppose on the other hand that the birth rate stays constant at two children per mother, but lives get longer. Then in future periods there are more retired people. If people were making provision for their own pensions, they would save more to provide for a longer retirement. So we may take it that a funded system should increase pension contributions for the same reason. More capital will be accumulated. There is no certainty about the impact of that on wages and interest; but the normal expectation is that wages will be greater and interest less. That is the same result as we had when the labour force fell.

An optimistic view is that faster capital accumulation does not reduce the rate of return to capital, a view that seems quite plausible when one observes that different countries with very different savings rates have similar rates of return. Within one country, that seems over-optimistic, but funding ought to be invested in the world capital market, where the changed behaviour of one or a few countries might not have much effect on returns. Still, the ageing phenomenon is widespread, and it is probably appropriate to assume some adverse impact of increased funding on returns.

The conclusion we reach is that, in either case or any combination, the earlier cohort, retired in the period of

reduced labour supply, will be worse off than if labour supply had not been reduced; while the cohorts working at that time will be better off, unless the labour supply continues to fall, which may offset the gain. Funding has the effect of getting each cohort to provide for its own needs and desires, but not without effects on later generations. The relative impact of an ageing population on working and retired people is the opposite of that under a pay-as-you-go system. In either case, an ageing population implies a need for greater contributions. They come earlier with funding.

7. DISTRIBUTION AMONG GENERATIONS

There is a school of thought in economics that regards it as highly desirable, even imperative, to place the provision of pensions on an entirely funded basis, possibly associated with privatization of the social security system. Martin Feldstein (Feldstein 1995) and others have argued that pensions will be more assured and more predictable in a funded system. (A rather different view is taken in Diamond (1996).)

Certainly if pension levels are defined relative to some standard, and guaranteed, and contributions are calculated on an actuarial basis and levied accordingly, then individuals know what they will be getting, once they have paid their contributions. Governments have not seen fit to guarantee the level of pay-as-you-go pensions; until quite recently some (Spain and the UK for example) have fixed them relative to the consumer price index, prospectively a rather niggardly level. If the market provided satisfactory pension schemes, and people knew what they were doing, they would nearly all have private pensions supplementing State provision, and in the outcome, we should have something like a funded system, but with less saving.

The main difference between the systems is indeed the difference in saving that is done. Compared to a funded system, pay-as-you-go favours those who were born earlier relative to those born later, essentially because, while they are working, less output is saved and more consumed. The question is, whether one can say that either of them tips the balance too far one way or the other, and how that might be affected by the ageing of the population. In addressing the question, I treat individuals as whole lives, asking how the systems affect the relative well-being of people born at different times, their well-being somehow representing consumption experience throughout their lifetimes. A generation is an age cohort, and generations overlap. People of different generations living at the same time may be equally well off at that time, but still not equally well off as people. I do not suppose, though, that unbiased treatment of generations implies that people of different generations will be equally well off, when whole lives are considered.

It is easiest to think about distribution among generations if each age cohort is homogeneous, consisting of essentially identical people, who are the same as people in other age cohorts. First, then, ignore differences in earnings among contemporaries, and

differences in length of life and need for medical care. Still, giving the same weight to people in different cohorts is not the same as claiming that people in different cohorts should enjoy the same levels of consumption at corresponding ages. If it were, we could conclude that earlier cohorts have been unfairly and inequitably treated, since in the industrial economies those born later have in the main enjoyed higher consumption levels than earlier ones, at least for much of this century.

The essential point is that consumption postponed is consumption increased. In resource terms, it is cheaper to provide consumption for later generations. At a five per cent real return on capital, a reasonable, even modest expectation, consumption postponed 25 years, roughly the time from mean working age to mean age in retirement, is increased by a factor of nearly 3.4. It is much cheaper to provide for the next generation's lifetime consumption than for this one's. It is reasonable therefore for later generations to enjoy some of the benefits of this favourable tradeoff.

Consider first an economy in which successive cohorts enjoy the same levels of consumption at the same ages. A utilitarian, giving equal weight to people born at different times, would say that in these circumstances, a unit of today's resources gives considerably more benefit to a future generation, if invested for that generation's benefit, than it would if spent at once on the present generation. If this is accepted, it follows that saving should be done, in order to make the lifetime consumption of later cohorts, at corresponding ages, greater. One might interpret the way that many individuals enjoy, in effect, rising per-capita consumption at least till retirement, and could have arranged things differently, as support for this view. Nevertheless, some may conclude, in the spirit of Rawls (though Rawls would not) that it is unjust for later age-cohorts to be better off. For them, even actual pay-as-you-go systems err in favouring later generations over earlier; for later cohorts are, generally, better off than earlier ones.

Can we be more precise about the bias among cohorts that is implied by a particular system? If people were effectively the same throughout their lives, and themselves gave equal weight to their consumption experience in different periods, a simple criterion could be used. We could say that in any year, the working and retired cohorts have been given equal weight if they have the same level of consumption in that period. But that is not enough. It must also be the case that the consumption of the retired is what they would have planned to have if they had been making provision for themselves, at the full rate of return; and that the present workers are similarly consuming what they would have had if they had made like provision for their own future consumption.

Is such an outcome the one we would get with pay-as-you-go or with funding? In general, neither. We can easily show that the full-funding system does not necessarily bring about this no-bias outcome. In the full funding system, for our simplified case, the workers and the retired may not enjoy the same standard of living in the same period. Take an extreme,

albeit unrealistic, example to prove the point. Suppose that people have a very strong preference for consuming the same amount in each year of life, and also, for simplicity, that population is constant. Then the equal-consumption-within-a-period principle implies constancy of consumption over time as well: there would be a no-growth economy, obtainable by a full pay-as-you-go system, not a funded system.

Apart from this contrived example, a full pay-as-you-go system does not achieve equal treatment according to the proposed criterion. In this very simple world, everyone at any time would enjoy the same level of consumption, and that level of consumption would be growing over time, since that is what people would want to do to take advantage of the positive return to capital. Consequently there will be a degree of funding. This is a special case of a much more general proposition. It is generally true that a fully pay-as-you-go system implicitly favours those born earlier over those born later.

It is harder to determine whether a full-funded system favours earlier or later generations. In principle, it could go either way. But if, say, people would like to plan a growth rate of their own consumption during their lives that is less than the growth rate of the economy, the full funding gives excessive weight to future generations. When one tries to allow for a more plausible view of the changes in people, their needs and preferences, during life, that conclusion seems to be strengthened. Specifically, the need for medical and other care in later life can be interpreted as a cost, reducing effective consumption below what is spent on the individual. It is all the more plausible that people want effective consumption to grow more slowly than per-capita economic growth, and the case against full funding is strengthened. These costs of care must be met of course. It appears that there is no very strong case for funding them.

These conclusions are little affected by the ageing of the population, whether as a declining population or one with lengthening lives. It is true that an economy with a falling labour force as a proportion of population can expect a lower rate of growth of per-capita consumption. To that extent, the desirable level of funding is rather greater than otherwise.

8. THE COMING CRISIS?

The arguments summarized here suggest that countries should increase the extent to which the pension system is funded, rather than pay-as-you-go. The case for doing so is somewhat strengthened by the prospect of an ageing population. The funding need not, and probably should not, be complete. The effect would be to start increasing pension contributions now, so as to increase funding of future pensions, while continuing to provide for current pensions. As the periods with a high proportion of retired are reached, some part of the extra pension requirement will then be matched by the capital accumulated with increased contributions in the intervening years, and part will fall to be met at the time. The consumption of the increased number of retired should indeed be provided, but only in part from the earnings of contemporaries, for earlier pension contributions should also provide a considerable part.

If we make this provision because we want to spend longer not working, then it is hard to regard it as a burden. But we may indeed prefer to work longer, and we should not be discouraged from doing so.

The actual picture in many economies is more complex, with considerable inequalities among the retired members of the population, some of whom have surprisingly high consumption from their own funds, others a low pension as State provision falls below what they might reasonably have anticipated. The older part of an ageing population should not be disadvantaged because we or our predecessors decide too late that we should in the past have had them contribute to their present pension.

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