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THE FISCAL IMPLICATIONS OF AGEING POPULATIONS IN OECD COUNTRIES

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I. Introduction

Substantial demographic changes have occurred in OECD countries in the past few decades. Since the post-war “baby boom”, fertility rates have declined to levels that in almost all OECD countries are now at or below the 2.1 children required to maintain a stable population, while improvements in living standards, health care and nutrition have led to a welcome increase in life expectancy. In 1960, average life expectancy in the OECD area was 66 years; today it is 77. Over the next five decades, fertility is projected to rise somewhat, but still remain below the rate required to stabilise the population, and life expectancy is expected to increase further. Together these trends will substantially modify the demography of countries towards an older and declining working-age population. As a result, the old-age dependency ratio – the number of people 65 years and over relative to the number aged between 20 and 64 – in the OECD area could more than double to reach nearly 50 per cent in 2050. Considerably sharper increases will take place in continental Europe and in Japan. The process is already well advanced in Japan, is currently evolving rapidly in Italy, and in most other OECD countries will start towards the end of this decade.

Given current social security arrangements and policies, the transition towards more elderly people relative to the number of workers will have pervasive effects on factor and product markets and will substantially impact on public finances, with important distributional implications, both between existing retirees and the working-age population as well as between current and future generations. This paper focuses on the likely pressures on government fiscal positions. In this regard, the main results of a recent OECD exercise, which examines the fiscal impact and sensitivity of age-related expenditures in OECD countries over the period to 2050, are synthesised.² This exercise is of particular interest as it aims to take into account the specific pension system frameworks operating in each individual country and to ensure cross-country comparability by adopting harmonised macroeconomic and demographic assumptions and common policy simulations.

The paper is structured as follows. Section II offers an evaluation of the nature and likely demographic changes expected over the next 50 years. Section III considers the recent OECD exercise conducted to (re) assess the fiscal implications of OECD ageing populations. Section IV highlights some of the many policy challenges and options, and the final section presents the main conclusions.

II. The changing demographic profile in OECD countries

Estimates of the degree of ageing depend on demographic assumptions about future birth rates, life expectancy and the level and age structure of migration flows. In their central (so-called “middle variant”) scenario, the most recent OECD countries’ national or, in the case of EU countries, Eurostat projections³ assume, during the next five decades, life expectancy to rise on average by 4½ years to reach 82 years (Table 1). The increase is broadly similar across countries, but where life expectancy is currently relatively low some convergence towards the average is assumed. Over the same period, fertility rates in most OECD countries are assumed to recover somewhat, but only to reach on average 1.7 children per woman, which is well below the 2.1 children required to maintain a stable population.⁴ The combination of

2. The main results of this exercise are presented in OECD (2001a). For a more extensive presentation and discussion of the exercise, which has been in part carried out in collaboration with the Working Group on Ageing of the Economic Policy Committee of the European Union, (Economic Policy Committee, 2000), see Dang *et al.* (2001).

3. These are the demographic projections on which the exercise discussed in section III is based.

4. This average excludes some OECD countries with relatively high fertility rates, most importantly Mexico and Turkey, as well as a few other countries (Greece, Iceland, Ireland, Luxembourg, Slovak Republic and Switzerland) which have also not been part of the exercise.

increased longevity and lower fertility would normally be associated with quickly ageing populations, but in Australia and Canada relatively high immigration flows (though lower than the current ones) are also assumed, which helps to moderate ageing pressures, and in the United States the fertility rate, despite an assumed fall, remains the highest among the OECD countries shown in Table 1. On the basis of these assumptions, the population in the 22 OECD countries considered here is expected to increase by about 53 million to reach nearly one billion. This is equivalent to an annual rise of only 0.1 per cent and compares with 1 per cent on average over the last 40 years. Moreover, in some 11 OECD countries the total population is projected to decline between now and 2050.

For the OECD area as a whole, these shifts are likely to lead to an increase in the median age by almost 10 years to reach 44 and to a decline in the overall working-age population (those aged 20 to 64) by 38 million. The number of people aged 65 years and over relative to the number aged between 20 and 64 – the old-age dependency ratio – will rise, particularly in the years after 2010, to reach almost 50 per cent by 2050 (from the current 22 per cent level).⁵ Considerably sharper increases in the dependency ratio, equivalent to around 2 per cent per annum are expected among some of the major European countries and Japan (Figure 1). In Italy, for example, the ratio which is already rising sharply is expected to continue doing so to reach a peak above 65 per cent around 2045. In Germany and France, it is likely to remain fairly steady over the next 10 years, but then quickly rise before stabilising at close to 50 per cent by the middle of the next century. For Japan, the dependency ratio has already doubled over the past 25 years to 28 per cent and is expected to more than double again to reach close to 65 per cent in 2050. In many countries, ageing appears to be increasing at the end of the period, suggesting further pressures beyond 2050. The composition of changes in the dependency ratio is also important, since the economic impacts are likely to be different. In virtually all OECD countries, the expected rise in the dependency ratio is accounted for from both increases in the population over 65 years old and declines, given low fertility rates, in the working-age population (Figure 2).

It should also be observed that projections might be hazardous if variations in the demographic assumptions led in the long term to significant differences in the age composition of the OECD population and hence on the dependency ratio. It turns out that a 15 per cent higher increase in the fertility rate over the next 30 years relative to the baseline would reduce the old-age dependency ratio by 3 percentage points by 2050. On the other hand, an increase in life expectancy of about 3 years would raise the dependency ratio by some 6 percentage points in 2050 (Table 3). These alternative assumptions for fertility and longevity correspond to a plausible range of actual outcomes and can give a reasonable sense of the bounds surrounding their direct contribution to how dependency ratios might evolve.⁶ Much more difficult to assess, however, are future migration levels. The assumptions for migration are typically made on the basis of recent flows. These could change sharply and quickly with immigration policy changes and impact on the dependency ratio, although increased immigration cannot realistically on its own resolve the ageing problem (United Nations, 2000).

Even over short periods, expected demographic projections could shift considerably. To illustrate, Table 3 compares four recent demographic projections. In many countries, old-age dependency

5. Together, increased life expectancy and low fertility will lead to substantial changes in the demographic profile of OECD countries. As the number of elderly people (65 years and above) is expected to increase substantially to reach over a quarter of the OECD population, the proportion of the very elderly (80 years and above) could almost triple by 2050 to reach 9 per cent. Over the same period the proportion of children and those in their prime age (20 to 54) will shrink in each of the main OECD regions. Also of note is the rise in the share of elderly workers (55 to 64 years), which is a group where attachment to the labour force is currently very low (Table 2).

6. For a considerably more pessimistic demographic outlook (faster and more ageing populations), see Schieber and Hewitt (2000).

ratios are higher the more recent the projection, and in some cases by a considerable amount. In Japan, for example, the old-age dependency ratio based on the latest United Nations central projection is 15 per cent higher in 2040 compared with the UN projections published only two years ago. Most of this rise is attributed to a large upward movement in Japanese life expectancy. Among projections of similar vintage there is also variation. The UN demographic outlook is less optimistic, in terms of the evolution of the dependency ratio, than that of Eurostat/national projections (Table 3, columns 3 and 4). For most countries, however, the dependency ratio in 2040 differs by less than 10 per cent. These comparisons of demographic projections illustrate the range of variation we have seen over the past decade and may provide an indication of the range of variation that might be expected in the future. But all the projections clearly indicate that every country will experience a trend towards ageing and low or negative population growth (especially important for the working-age cohorts) over the next 4 decades. And the calculations reported in Table 2 indicate that, even if non-negligible, the sensitivity of old-age dependency ratios to fertility, longevity and net migration changes is not such to alter significantly the broad picture presented in the baseline projections.

III. The fiscal implications of OECD ageing populations: a recent simulation exercise

Under current institutional arrangements, where public pensions are paid out of the contributions of today's workers, fewer workers supporting a larger number of generally longer-living retirees will put budgetary positions in OECD countries under increasing pressure. Moreover, many other public expenditure programmes are affected by demographic shifts. These include programmes permitting early withdrawal from the labour market, health care and long-term care for the frail elderly, family/child benefits and education. Overall, between 40 and 60 per cent of total public spending is sensitive to the age structure of the population.

In the last decade the OECD has produced several studies to evaluate the contribution of demographic shifts to fiscal pressures, on the basis of a number of partial and general equilibrium models and accounting frameworks.⁷ Each of the studies found that unless reforms are implemented, projected pension benefit levels will greatly exceed projected pension contributions and thereby exert mounting fiscal pressures. Though more difficult to quantify, similar effects would come from the rise in other age-related expenditures, such as on health care. The specific results of the simulation exercises vary, however, indicating the large bounds of uncertainty and the sensitivity of the findings to the projection methodology and system parameters used. Moreover, the modelling frameworks inevitably abstract from country specific institutional details. Furthermore, these simulations probably exaggerate the likely fiscal outcomes, since they are typically based on a no-change scenario, while reforms are more likely in countries where the projected fiscal burden of ageing is most serious. Indeed, since these studies were completed a number of countries have announced or implemented reforms to the structure of public pension systems and other age-related programmes.⁸

The main difficulties in assessing the budgetary impact of ageing populations are those associated with projecting the factors that influence per capita old-age benefits. Comparing OECD projections on pension spending from the 1980s (OECD, 1988) with the actual outcomes in the mid-1990s provide an illustration of the pitfalls of projecting old-age pension outlays on the basis of a simple

7. See Hagemann and Nicoletti (1989), Auerbach *et al.* (1989), Van den Noord and Herd (1993), Leibfritz *et al.* (1995), Roseveare *et al.* (1996), Turner *et al.* (1998).

8. A summary of recent policy initiatives is included in OECD (2000).

extrapolation of key parameters (Table 5).⁹ Public pension expenditures were projected by broad age cohort assuming that per capita benefits remained constant in real terms, so as to capture the impact of shifts in the demographic profile of a country. While projections of old-age dependency ratios proved, in the majority of countries shown, to be broadly accurate over the 15-year period (with the relevant exception of Italy and Japan), actual spending on pensions has risen much faster than originally conjectured. The main factors that explain the larger than projected increase in pension spending are the failure to account for the maturation of pay-as-you-go pension systems, the fall in labour force participation rates among older male workers and, most importantly, the assumption of benefits being constant in real terms, while in most countries they actually tended to grow in line with real incomes (Oxley, 2001).

A new OECD exercise (see OECD, 2001a, and Dang *et al.*, 2001) has resulted in the production of more up-to-date estimates of the fiscal impacts of ageing. In order to better reflect the institutional detail affecting expenditures than has been possible in previous work, these simulations are based on the models used by national administrations or research institutes and take account of the policy initiatives implemented over the past 5 years. Furthermore, and in order to strengthen the cross-country comparability of the results, the simulations are based on a set of population projections and common assumptions for labour productivity growth, labour force participation and other key macroeconomic variables agreed between the countries and the OECD.¹⁰ Also, extensive sensitivity analysis has been carried out to show the impact of changes to key assumptions.¹¹

On the basis of these assumptions and unchanged policies, national administrations have provided their baseline projections for old-age pension spending.¹² These show a rise on average by around 3 to 4 percentage points of GDP over the period to 2050, with considerable cross-country variation

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9. The comparison with actual outcomes, however, needs to be interpreted with care as the 1988 study aimed to isolate only the demographic trend on pension spending. Furthermore, the data used by OECD (1988) were mostly drawn from national sources while the actual outcomes in Table 5 come from the OECD Social Expenditure Database, which is based on common definitions across countries.
 10. As mentioned, part of this exercise has been carried out in collaboration with the EPC of the European Union. A number of considerations need to be kept in mind when interpreting the results. In particular, while the OECD has helped co-ordinate the preparation of the simulations produced by the national experts, it has not attempted to vet the models used. Furthermore, the OECD has not controlled the use of underlying assumptions within the models beyond those agreed with the experts (population and the macroeconomic environment). It should also be noted that the projections summarised in this paper might differ from those used by national administrations in their “most likely” scenarios, because of differences in assumptions.
 11. The main macroeconomic assumptions concern: i) the labour force participation rates, based for the period to 2010 on ILO projections (ILO, 1997) and, for the subsequent period assumed to remain constant for men and persons outside the 20 to 64 years range, while progressively rising for women towards ceilings at the end of the period 5 percentage points below those of men in countries with widely subsidised child-care and 10 percentage points below elsewhere; ii) unemployment rates are set to fall to their structural levels (as defined by the OECD) by 2005 and remain constant thereafter, although somewhat larger falls were allowed in countries where existing labour-market reforms could lead to lower structural unemployment; and iii) labour productivity growth (measured as GDP per worker), generally assumed to converge to reach a rate of 1.75 per cent per year during the period 2020 to 2030. As observed in the previous section, the ageing population profiles used for the study are based on the middle variant of Eurostat demographic projections for the countries in the European Union and national projections for the remaining countries.
 12. Old-age pension spending includes, in principle, all spending that is an integral part of public pension systems (e.g. survivors’ pensions). But comparisons of initial national spending levels with the OECD social expenditure database suggest that programme coverage may be less than complete for Austria, Denmark, Korea, the Netherlands, Norway, the United Kingdom and the United States, and hence the projections reported here may involve some degree of underestimation.

(Table 6). Smaller increases, or even reductions, are found in countries with limited ageing and low initial spending levels (e.g. Australia, Hungary, Sweden, the United Kingdom and the United States) or where recent reforms have been introduced (Italy and Poland).¹³

The main factor contributing to changes in spending, which typically peaks over the period 2035 to 2045, is an increase in the old-age dependency ratio.¹⁴ Taken on their own, changes in the old-age dependency ratio raise pension outlays as a share of GDP on average by some 5 percentage points (Table 7, third column). Partly offsetting this rise is an assumed higher ratio of employment relative to the working-age population and an estimated decline in the average pension benefit relative to GDP per worker, in part reflecting the impact of recent reforms (Table 7, fourth and fifth columns),¹⁵ while in most countries the share of beneficiaries in the population aged 55 and over is projected to increase (Table 7, sixth column).¹⁶

In some countries (e.g. France, Germany, Italy, Japan, Poland, Sweden and the United Kingdom) the fall in average benefits relative to wages is particularly marked (between 20 and 50 per cent). In some cases this mostly reflects the shift, in countries where benefits are largely paid through earnings-related schemes, from indexation of pensions on wages towards indexation only on prices; in others, where flat-rate pension arrangements aim to provide a minimum basic income for the elderly irrespective of their work history, the fall in benefits reflects the assumed constancy of the flat-rate basic pension in real terms over the whole simulation period (this is the case of the United Kingdom).¹⁷ It is clear that in these cases, either a (substantial, in some cases) build-up in private pension saving is fostered to maintain income adequacy in retirement, or it is likely that the prospect of much lower incomes and increased poverty among the elderly raises the risk of political pressure for a reversal of recent policy reforms and changes to particular transfer schemes.

The second most important public expenditure item on elderly persons relates to health and long-term care. Reported public health and long-term care spending averaged around 6 per cent of GDP in 2000 and again with considerable cross-country variation (Table 8). Formulating projections for these public outlays is considerably more uncertain than for pension expenditure. Unlike pensions, there is no framework of existing rules that provides a basis for projecting the demand for and supply of health care. Partly as a result, the method of projecting health care spending can vary considerably. Furthermore, there is a great deal of uncertainty as to which demographic features are most important for driving health care

13. In the case of Japan, the result mostly reflects legislation that requires benefits to be adjusted every five years to bring the pension system into balance.

14. On the other hand, initial variation in pension spending as a share of GDP in 2000 reflects differences in programme characteristics, including the degree of system maturity and the degree to which pensions are financed through the public sector.

15. Reforms have included a reduction in benefit rates, as a result of a change in the indexation of pensions from wages towards prices (Finland, France, Hungary, Italy, Japan and Korea) or from pre-tax to after-tax wages (Germany), lengthening the contribution period for a full pension (France) and lengthening of the reference period for calculating pensions (Belgium, the Czech Republic, Finland, France, Italy and Spain). For further details see Dang *et al.* (2001).

16. The increase in the share of beneficiaries due both to the higher employment rates of women and the maturing of pension systems is in principle offset by the effect of reforms aimed, in a number of countries, at directly increasing the effective age of retirement. Only for Austria, Italy and Poland do these reforms appear sufficient to reduce significantly the overall share of pensioners.

17. In the case of the United Kingdom the pension projections do not take into account the effects of the minimum income guarantee, so that benefits, linked to prices alone, decline continuously over time relative to GDP, overestimating the likely reduction.

spending. For example, since a large part of spending is made during the last months of life, a key question is whether spending patterns by age group are related to mortality. If so, longer life expectancy may delay increases in health spending. For the OECD study, most countries providing estimates for future health and long-term care outlays projected per capita health care expenditures by age group, which rise with age, multiplied by the number of people in each age group. Overall, health care spending relative to GDP is estimated in the 14 countries where this information is available to increase by more than 3 percentage points to 2050.

In addition to old-age pensions and health care, most countries have programmes that provide income support for those of working age, which are often seen as an integral part of overall pension arrangements. Examples include disability pensions, long-term unemployment benefits and early-retirement arrangements for labour market reasons.¹⁸ While the coverage varies across countries, these programmes represent around 1½ per cent of GDP in the countries providing data. Despite the increasing average age of the working population and hence higher probability of becoming disabled, countries providing projections for these expenditures anticipate broad stability or marginal declines relative to GDP over the next 50 years. This is presumably attributed to reforms already undertaken to tighten access to these programmes and to limit the generosity of benefits, as well as the assumed drop in unemployment. These projected trends in spending on the elderly are only expected to be partially offset, by around 1 percentage point of GDP on average over the projection periods, by lower spending on education and family/child benefits in line with falls in youth dependency ratios.¹⁹

Overall, total age-related expenditures relative to GDP could rise on average by about 7 percentage points over the period 2000-2050 for countries projecting more spending categories than just old-age pensions, to reach over one quarter of GDP (Table 6). Assuming that non-age-related spending is unchanged as a share of GDP over the period (except as a result of policies already enacted and of the macroeconomic assumptions, e.g. lower spending on unemployment benefits) and allowing for some age-related increases in tax revenues, the projections thus indicate an average decline in the primary balance (lower surplus or higher deficit) as a share of GDP of 6 to 7 percentage points (Table 9).²⁰

The total impact on the public debt levels of these developments in age-related spending will depend on the cumulated change in the primary balance over the projection period coupled with the associated change in debt interest payments. The outcome in terms of the net public debt as a share of GDP is highly sensitive to the initial levels of debt and the primary balance, the change in the latter through the period, and the assumed level of the interest rate relative to GDP growth. In Table 10 the change in debt associated with the rise in age-related spending is calculated for a “typical” OECD country, constructed using a set of parameters close to the middle range for actual OECD countries (pension spending equal to 8 per cent of GDP, a primary surplus of 2.5 per cent and a net debt to GDP at 55 per cent). GDP growth is in line with the productivity assumption and average demographic developments at about 2 per cent and the

18. Such programmes have contributed in many countries to the marked fall in the participation rates of older male workers over the past several decades (Blöndal and Scarpetta, 1999).

19. In practice, it has been difficult to make cuts in these areas and there may well be further pressures arising from longer periods of education for the young, increased training for older workers and more demand for publicly subsidised child-care as the share of women working increases.

20. The projected deterioration in the primary balance is likely to be substantially larger than the impact of old-age pension spending alone in the countries, which project only the latter. This can be seen by examining the projections for countries providing estimates of age-related budget items other than pensions as shown in Table 9. For those countries, the additional deterioration in the primary surplus due to non-pension age-related spending is 2½ percentage points of GDP.

real interest rate is equal to 4 per cent.²¹ In such a country, ageing would lead to an increase in public debt as a share of GDP over the period to 2050 of about 200 percentage points. The actual increase in debt would, however, be slightly less than 100 percentage points: about half of the impact of age-related spending would be offset by sustaining the initial primary surplus over the entire period.

Small changes can lead, however, to substantial differences. For example, if real interest rates are assumed to be 1 percentage point lower, they could reduce the impact of ageing on debt by about one third. Likewise, an assumed 10 percentage point lower initial debt to GDP level would have a smaller impact on debt by 2050, equivalent to 20 percentage points on the debt ratio. Such sensitivity makes simulations of debt outcomes for individual countries highly uncertain. But the results suggest that countries will be in a better position to confront ageing pressures if their primary surpluses are sufficiently high for them to reduce their net-debt positions rapidly in the period before dependency ratios begin to rise sharply. For example, with a sustained primary deficit of 1 per cent of GDP (rather than the 2.5 per cent primary surplus), the typical country's net debt-to-GDP ratio would increase by more than 400 percentage points by 2050; the increase in the debt ratio would be, instead, about 300 percentage points with a primary surplus allowed to decline to zero by 2010, and remain there for the rest of the period.

IV. Challenges for policy

The response suggested by the OECD to the structural changes and fiscal pressures associated with ageing populations stresses the need for action on many fronts.²² The specific combination of measures will depend on the country circumstances and needs to be formulated within well-balanced national frameworks. As shown, however, demographic trends provide only a narrow window of opportunity before reform will become much more painful. To illustrate, based on the projections of age-related spending discussed in section III, a stylised reform where average pension benefits are cut so as to maintain the share of net debt to GDP constant at its 2000 level by 2050, implies a reduction of 17 per cent if implemented in 2005. But if such a measure were delayed by 10 years it would increase the required adjustment in average benefits by around $\frac{1}{4}$, and delaying them by 20 years would require an increase of around $\frac{3}{4}$ (Table 11). In addition, because many reforms require advance notice and gradual implementation, responses need to be put in place early. Indeed, a major difficulty and challenge for policy makers is anticipating problems and building support for reforms even though the impacts of ageing are only likely to arise one or two decades down the road.

Even if the OECD strategy is a comprehensive one, and no single policy option is favoured, there are several broad areas for targeted reform. Among these, two are briefly discussed in what follows: firstly, shifting towards fully funding pension liabilities and more generally encouraging a diversified range of retirement income sources and, secondly, modifying public pension generosity and eligibility criteria (for instance by increasing the average number of years individuals spend actively in the labour force). In

21. The calculation assumes that non-age-related primary government spending and revenues are constant relative to GDP, implying that changes in the primary balance are fully driven by age-related spending.

22. As a result of the analysis synthesised in OECD (1998), a number of principles to guide reforms, within well-balanced national frameworks, were identified. In particular, financial incentives to early retirement should be removed and ways to enhance job opportunities for older workers and improve their skills and competencies should be looked for. Public pension benefits should be reduced, for given contributions, to ensure fiscal consolidation and lower the public debt burdens associated with the ageing of populations. At the same time risk diversification should be pursued and retirement income provided by a mix of tax-and-transfer systems, funded systems and private savings, with the development of advance-funding pension systems linked with the strengthening of financial market infrastructures. Finally, cost-effectiveness in health and long-term care should be pursued.

addition, a complementary approach to ease future fiscal pressures and support improvements in living standards via policies that promise to boost productivity performance will also be briefly considered.

Diversifying the sources of retirement income

An important and universal element of the OECD strategy is to reform the structure of retirement income to take account of all the resources available to older people, including public and private pensions, earnings and assets. A more diversified structure of retirement income is needed so that sources other than public pension payments play a growing role in provision for retirement and help spread the burden across generations. A wider range of income sources would also help lower the risk of future income loss.

The so-called “3 pillar” approach would put in place a system where retirees would potentially have three sources of pension payments; income from a pay-as-you-go pension, from a compulsory fully funded pension plan and from a voluntary fully funded pension plan. Specific measures to diversify retirement income provision and facilitate the “3 pillar” system could include increasing the size of advance-funded elements in countries where pay-as-you go systems now dominate; reducing the size of public pension benefits where these are now particularly high; adjusting earnings-related pensions so that there is a direct link between life-time benefits and contributions and separating the anti-poverty and income-replacement elements of public pensions into different programmes.

Some countries have taken initial steps along these lines, which lay the ground for future change, and a few countries have taken measures that will ultimately make their pension systems broadly neutral by strengthening the link between life-time contributions and pension benefits. Mexico, for example, has transformed its previous pay-as-you-go system into a fully funded capitalisation system. In Italy, while its pay-as-you-go system will be retained, pension benefits will be determined by the stock of contributions and made available from the age of 57 onwards, with adjustments reflecting life expectancy and expected GDP growth rates. Other countries – such as Hungary, Poland and Sweden – have introduced or will introduce two-tier pension systems: a pay-as-you-go tier and a fully funded compulsory tier.

There appear to be limits, however, on the speed that a country can move towards the “3 pillar” system, because of intergenerational equity considerations, as current workers would be paying twice; once for the pensions of the current retired and again for their own pension fund.²³ No fully satisfactory solutions to this problem are available. In any case, financial structures and taxation systems would require modification, which also implies a period of transition. As Richard Disney clearly puts it: “The long-run solution seems to involve a strong funded element, but the transition costs have to be handled carefully and partial strategies need to take particular care as to their distributional consequences and potential for complexity.”²⁴

Lengthening working lives and raising employability

A strong OECD recommendation, also advanced in the 1998 G10 report, points to the need of reducing disincentives to early retirement and improving the working possibilities of the elderly population. If the transition from productive activity to retirement could be delayed, the fiscal impact of ageing would be reduced, because the number of pension beneficiaries would fall and because output and

23. For a discussion of the fiscal costs associated to a shift from a pay-as-you-go to a fully funded pension system, see Chand and Yaeger (1996).

24. Disney (2000), p. F21. In Mirrlees (1997), a forceful welfare argument, strengthened by the prospect of an ageing population, is also made in favour of increasing the extent to which pension systems are fully funded rather than pay-as-you-go, even if it is suggested that funding should not be complete.

taxation revenues would be higher due to greater employment. As an approximate order of magnitude, a reduction in the number of pension beneficiaries of around 8 per cent would be sufficient to neutralise the impact of ageing on the public debt to GDP ratio.²⁵ To put this into some perspective, this is broadly equivalent to countries on average increasing their non-age-related primary surplus in present value terms by around 1 percentage point (Table 9).

Since the economic impact of ageing populations is directly linked to fewer workers relative to the total population, it follows that such impacts can be contained to the extent that working lives are extended as we live longer, and/or through increased attachment to the labour force, for instance via increased participation of older workers and females. Similarly, productive potential could be enhanced to the extent that structural levels of unemployment can be lowered. The scope to raise the number of years spent active in the labour force and to generally enhance employability is large. This is because life expectancy has risen and will presumably continue to rise, as well as because of the relatively low age at which workers currently withdraw from the labour market and the very low employment rates of older workers (aged 55 to 64) in some countries. The potential, however, varies widely between countries, reflecting differences in the structure of incentives to continue to work and consequently the average effective age of retirement.

For instance, in France, the Netherlands and Spain the employment rate has declined to less than 35 per cent for the 55 to 64 year old population and to about 25 per cent or below in Italy and Belgium, while in others, such as the United States, Japan, Korea, Norway and Sweden, it is well above 50 per cent and has remained broadly steady over the past 15 years (Figure 3). There may also be endogenous forces since the relative scarcity of labour arising from the decline in the working age population might result in upward pressure on real wages and thus motivate an increase in the participation rate across all age groups. On the other hand, such real wage effects may themselves be offset by higher taxes and social security contributions needed to finance the increasing pension and health care burden.

It has been estimated, with respect to the situation prevailing in the early 1990s, that increasing the incentives to remain in the labour market could lead to an increase in the participation rate of older workers by about 8-9 percentage points in those countries where the financial penalties were particularly large (Finland, France, Italy, the Netherlands and Portugal).²⁶ Such improvements would help ease the budgetary pressure on public pension funds and social security budgets in general and would also limit the extent of the slowdown in the growth of living standards. But an increase of this magnitude will not come about of its own accord. Specific policy measures are needed such as, for instance, increasing the length of the contribution period for full benefit and generally linking life-time benefits and contributions; removing pension earnings rules and other penalties for working later; increasing the average age of entitlement to full pension and the lower age limit for early retirement; and phasing out programmes that encourage access to invalidity or open-ended unemployment benefits for labour market reasons. Several countries have already taken initial steps along these general lines.²⁷

In an earlier paper (Visco, 2001a), some rough sensitivity calculations of age-related spending to labour market developments illustrated the potential for higher female and older worker labour force participation rates and lower structural unemployment to offset the pressures of ageing on output and,

25. This corresponds to the effective age of retirement rising by approximately one year.

26. See Blöndal and Scarpetta (1999) for details on the model used to calculate these effects on the male participation rate. In some of the countries where the potential impact on male participation rates is high measures have since been implemented, which make the pension system more actuarially neutral. This is especially so in Italy.

27. A detailed description and analysis of recent reforms can be found in OECD (2000).

therefore on, fiscal positions. It was concluded that to the extent that improvements could be realised, output would be increased and pressure on age-related spending correspondingly reduced, especially in countries where labour force attachment rates are initially low (e.g. Austria, Belgium, Italy, the Netherlands and Spain).

As an example, within the simulation exercise discussed in section III of this paper, a decline in the unemployment rate to the levels prevailing in the late 1960s would on average reduce spending on old-age pensions, as a share of GDP, by about a $\frac{1}{4}$ of a percentage point, and total age-related spending by almost $\frac{1}{2}$ of a percentage point, between now and 2050 (Table 12). In general, measures which facilitate further increases in employment/participation rates are also desirable and need to be pursued, even if it should also be recognised that increased labour utilisation would lead to a build-up in implicit government pension liabilities, which the state will have to honour in the future. Also in this case, though non-negligible results may be obtained, there are limits to the mobilisation of labour resources into remunerated productive activity, and large increases in the employment rate are unlikely on their own to prove sufficient to deal with the direct impacts of ageing populations. To illustrate, a 5 percentage point increase in either the participation rate of older workers or that of women relative to the baseline in 2050 would again on average only reduce total age-related spending relative to GDP by $\frac{1}{2}$ a percentage point.

How important is increasing productivity growth?

It is sometimes advocated that complementary approaches necessary to support improvements in living standards and to ease future fiscal pressures should be considered. For instance, it is argued that harnessing the “new economy” would offer a substitute response to ageing pressures, since increased productivity growth (in itself a positive achievement) implies higher living standards and provides additional scope to modify pension benefit levels and contribution rates.

The OECD has recently completed a major series of studies to better understand the factors shaping the growth process and the set of policies that favour a better growth performance.²⁸ The evidence suggests that the accumulation of various kinds of capital – physical and, especially, human – as well as research and development are important for growth. Also important are a broad set of policies extending to sound macroeconomic management, openness to international trade and competition, a tax system that encourages work effort and entrepreneurship, and government expenditure programmes that emphasise investment and capital accumulation. Appropriate conditions in financial markets and product market regulations also play a role in fostering innovation and productivity enhancement.

It is not certain, however, that higher productivity growth would make a large and automatic contribution to directly ease the future fiscal pressures of ageing populations. The impact depends on the degree to which the linkages between higher productivity and wages feed through to higher per capita pension payments. This in turn depends on the specific institutional arrangements governing pension systems. In countries where pensions are regularly indexed to some measure of earnings, faster productivity growth would only have a minor impact on government pension spending relative to GDP. This is the situation in many European Union countries, including Austria, Denmark, Germany, the Netherlands, Portugal and Sweden, although the link is not automatic in all of these countries. On the other hand, when there is no direct link between pension benefits and earnings of those in work, higher productivity growth is likely to make a sizeable impact, since the generosity of benefits over the pension period would be reduced over time. In earnings related pension systems, however, the budgetary impact is only transitory, as higher productivity leads to an increase in the wages of those currently working and hence their pension benefit in retirement.

28. For a synthesis of the findings of this work see OECD (2001*b*).

The European Union countries where pensions are only or mostly linked to price movements include Finland, France, Italy, Luxembourg, Spain and the United Kingdom. The European Commission has estimated that in some of these countries (France and Luxembourg were not part of this simulation) a 0.5 per cent per annum higher productivity growth – a relatively modest assumption when compared with the slowdown in European and US productivity growth in the late 1970s and 1980s or with the pick-up achieved in the United States over the 1990s – could ease the level of public expenditures relative to GDP by about 1¼ percentage points on average compared with the level it would have otherwise reached. It should be observed, however, that past experience shows that, to avoid substantial declines relative to average earnings levels, higher living standards as a result of increased productivity have generally led to public pressures for increases in pension benefits.

For the average OECD country, however, higher growth would only provide a rather partial offset; very substantial increases in economic growth (through higher productivity) would be needed to significantly counter the economic costs of ageing.²⁹ To illustrate, under current institutional arrangements it is found that 0.5 per cent a year higher productivity growth over the next 50 years might ease the increase in the level of pension expenditures relative to GDP by only about ½ of a per cent, compared with the level it would have otherwise reached, and by slightly more if all age-related expenditures are considered (Table 12). Nonetheless, if productivity growth can be raised, this is in itself a positive achievement as it implies an improvement in living standards and increased government revenues. This would provide additional scope to modify pension benefit levels and contribution rates, helping to introduce the public pension reforms necessary to address the fiscal challenges that ageing populations pose.

V. Conclusions

While living longer and in good health is a marvellous achievement, especially if one has the resources to enjoy it, a consequence of a contracting labour force (in particular associated with low fertility rates) might be, all other things equal, to undermine material living standards. Furthermore, under current institutional arrangements where public pensions are paid out of the contributions of today's workers, fewer workers supporting more and older retirees will put budgetary positions in the OECD countries under increasing pressure. In addition, health care spending is also likely to increase significantly. Overall, the most recent and thorough projections conducted across OECD countries show that budgetary pressures from ageing populations could add on average some 7 percentage points, as a share of GDP, to government outlays on the aged. This may even turn out to be a conservative estimate, as it is based on possibly optimistic assumptions concerning old-age dependency rates.

In 1930, a period of numerous technical innovations, John Maynard Keynes wrote a thoughtful essay imagining the economy 100 years hence.³⁰ He predicted substantial improvements in living standards stemming from capital deepening and technical change and concluded that adjustment to productivity increases will ultimately imply a need to work only a 15-hour week in order to meet economic needs. While Keynes was correct on capital accumulation and technical innovations, as well as on the substantial

29. A similar point could be made with respect to the possibility that higher immigration could ease the impact of ageing in OECD countries (see United Nations, 2000, and Coppel *et al.*, 2001). While increased immigration can limit the adverse impact on living standards and government budgetary positions due to declining and ageing populations, it can hardly be a decisive factor. On average, the estimates reported in Table 12 put at slightly less than ¾ of a per cent of GDP by the end of 2050 the decline induced in all age-related spending by immigration levels 50 per cent higher than in the baseline. A similar effect would be obtained for fertility rates 15 per cent higher than in the baseline, while an average increase in longevity of about 2½ years might imply higher spending levels of about 1½ per cent of GDP.

30. See Keynes (1933).

improvements in living standards, his bold conclusion about the working week reminds us all how wide of the mark long-term predictions can turn out to be. In the context of ageing, it is possible that demographic trends might be reversed, as a consequence of technological, economic and social developments. Still, it has to be acknowledged that population ageing trends in OECD countries are in good part dependent on demographic changes that have already taken place or are unlikely to be reversed. Projections of their fiscal and economic implications are then helpful in better understanding whether and how policy should respond.

It will be very difficult to escape from the fiscal impact of ageing populations. Moreover, this impact and the possible policy responses to it are likely to have significant intra and intergenerational distributional effects. While these may be evaluated with various degrees of precision, for example by means of specifically designed overlapping-generations models, the most likely conclusion is that a Pareto optimal solution is not within reach. The policy responses, then, will have also to be evaluated having in mind the possible political and social costs of specific reforms.

A few years ago, the OECD indicated that a strategy based on a comprehensive approach, within well-balanced national frameworks might be best suited to address the challenges coming from the ageing of populations. In this paper two lines of actions have been discussed as certainly fruitful, the first aimed at increased funding of pensions, within a multi-pillar approach that should take account of possibly significant transition costs, and the second aimed at lengthening working lives and raising employability. The possibility of beneficial effects linked to higher productivity growth has also been considered, concluding that even if possibly non-negligible, these effects are unlikely – for reasonable changes and trends – to substantially ease the future fiscal pressures of ageing populations.

In conclusion, while ageing should not necessarily be seen as a problem in itself, its fiscal and economic consequences may be such that action on many fronts will be needed. It is certainly possible that technological progress, favoured by an endogenous response to the demographic shock, may help to reduce the burden of necessary reforms. Nonetheless, reforms will require advance notice and gradual implementation to minimise the distributional burden. The challenge for policy makers is significant, as they need to anticipate problems and build support for reforms, even though the effects are only likely to be seen one or two decades down the road. Some progress has however already been made, and more certainly will come. After all, the historical record offers a rich testimony of mankind's ability to change when faced with major challenges. Even if some of Keynes' specific predictions about the long-run future were evidently wrong, he was certainly correct to stress the adaptability of the human race. And this optimism should be shared.

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Table 1. Assumptions for fertility, life expectancy and immigration

	Fertility		Life expectancy at birth		Immigration	
	(children per woman)				(per cent of total population)	
	2000	2050	2000	2050	2000	2050
Australia	1.7	1.6	79.4	85.2	0.9	0.4
Austria	1.3	1.5	78.1	83.2	0.1	0.3
Belgium	1.5	1.8	78.4	83.0	0.1	0.1
Canada	1.6	1.5	78.4	82.0	0.6	0.4
Czech Republic	1.1	1.5	75.0	78.4	0.1	0.2
Denmark	1.8	1.8	77.0	81.0	0.2	0.2
Finland	1.7	1.7	77.5	82.4	0.1	0.1
France	1.7	1.8	78.8	83.5	0.1	0.1
Germany	1.4	1.5	77.8	82.5	0.4	0.3
Hungary	1.3	1.6	71.0	77.9	-0.1	0.0
Italy	1.2	1.5	78.7	83.5	0.1	0.2
Japan	1.4	1.6	80.8	83.0	..	..
Korea	1.7	1.6	74.4	79.6	..	..
Netherlands	1.7	1.8	78.2	82.5	0.2	0.2
New Zealand ¹	..	..	77.7	82.5	..	..
Norway	1.8	1.8	78.5	82.3	0.3	0.2
Poland	1.3	1.6	74.0	81.6	..	..
Portugal	1.5	1.7	75.6	81.0	0.1	0.2
Spain	1.2	1.5	78.5	82.0	0.1	0.2
Sweden	1.5	1.8	79.7	84.0	0.2	0.2
United Kingdom	1.7	1.8	77.6	82.5	0.2	0.1
United States	2.1	2.0	76.8	81.3	0.3	0.2
Average of countries above ²	1.5	1.7	77.4	82.0	0.2	0.2

.. Indicates unavailable data.

1. Data are for 1996 and 2051.

2. OECD average is unweighted and excludes countries where information is not available.

Source: OECD (2001a).

Table 2. Share of older workers (55-64), the very old (80+) and youth ratio (0-19)

(Per cent share and changes in percentage points)

	Older workers		The very old		Youth dependency ratio	
	Individuals aged 55-64 as a per cent of those 20-64		Individuals aged 80+ as a per cent of those 65 +		Individuals aged 0-19 as a per cent of those 20-64	
	2000	Change, 2000-50	2000	Change, 2000-50	2000	Change, 2000-50
Australia	15.3	8.1	..	..	..	..
Austria	18.4	5.8	22.2	16.5	36.3	-4.0
Belgium	17.1	6.5	20.6	15.8	39.3	-0.6
Canada	14.8	9.4	23.8	12.3	41.9	-9.0
Czech Republic	17.1	9.8	..	..	36.1	-4.3
Denmark	20.8	2.2	26.3	8.2	39.7	-6.1
Finland	..	..	22.3	13.4	38.5	-3.5
France	15.8	7.0	22.5	15.1	43.6	-4.0
Germany	20.7	3.7	21.8	17.6	34.1	-1.4
Hungary	17.8	7.1	..	..	38.2	-3.5
Italy	19.0	5.6	21.7	17.2	31.7	0.9
Japan	20.8	2.6	..	..	33.0	2.5
Korea	12.8	9.6	..	..	47.0	-11.7
Netherlands	16.1	6.0	23.2	13.8	39.3	0.3
New Zealand	15.4	8.7	..	..	51.1	-10.0
Norway	16.4	5.7	..	..	43.8	-2.9
Poland	14.4	12.5	..	..	46.5	-12.7
Portugal	17.5	3.8	18.5	9.6	35.9	0.5
Spain	16.3	7.4	22.0	11.2	35.1	-1.5
Sweden	19.9	5.4	28.4	7.3	40.9	-3.1
United Kingdom	17.0	2.8	25.2	11.5	43.3	-5.4
United States	14.9	6.5	26.5	9.6	48.7	-4.4
Average of countries above ¹	17.1	6.5	23.2	12.8	39.1	-3.8

1. OECD average is unweighted and excludes countries where information is not available.

.. Indicates unavailable data.

Source : OECD (2001a).

Table 3. Sensitivity of old-age dependency rates to higher fertility rates, life expectancy and net immigration ¹

	Baseline scenario		Higher fertility rate ²	Longer life expectancy ³	Higher net immigration ⁴
	2000	2050	2050	2050	2050
Austria	25	55	52	62	51
Belgium	28	50	46	56	48
Canada	20	46	46	..	..
Czech Republic	22	57	54	64	56
Denmark	24	40	35	44	39
Finland	24	48	45	54	47
France	27	51	47	57	50
Germany	27	53	50	60	50
Greece	28	59	55	66	55
Hungary	28	50	..	..	..
Ireland	19	44	41	49	42
Italy	29	67	63	75	63
Japan	28	65	61	72	..
Korea ⁵	11	45	48	52	..
Luxembourg	23	42	39	47	38
Netherlands	22	45	42	51	45
New Zealand	28	50	..	..	..
Norway	28	50	..	..	..
Poland	20	55	52	60	..
Portugal	25	49	46	54	46
Spain	27	66	62	73	62
Sweden	29	46	43	52	44
United Kingdom	26	46	43	52	45
United States	22	38	35	44	36
Average of above countries ⁶	25	51	48	57	48

1. The old age dependency ratio is the elderly population (65+) as a percentage of the working age population (20-64).

2. Fertility rates are assumed to rise by 15 percent relative to the baseline up to 2029 and remain constant at that level thereafter.

3. Mortality rates are assumed to fall by 30 percent and 20 percent respectively for males and females for all age groups by 2050. This corresponds, for instance, for males to about 3 years of gain in life expectancy at birth and less than 2 years of gain at 65 years old.

4. Net immigration, in numbers of persons, gradually increases from current (or estimated) levels in the year 2000 to +50 percent above the 2010 level, remaining constant over the rest of the period.

5. Korea assumed a lower fertility rate for this scenario.

6. Unweighted average of countries shown.

Table 4. Comparison of population projections for 2040

	Index 2000=100			
	World Bank	UN 1998 Revision	Eurostat/ National projections	UN 2000 Revision
	early 1990s	late 1990s	late 1990s	2001
	Total population			
Australia	119.6	131.6	131.6	132.8
Belgium	94.4	92.3	101.7	96.6
Canada	117.5	131.0	131.0	127.4
Denmark	97.5	94.3	105.6	98.4
France	104.7	103.2	107.2	105.9
Germany	86.1	93.1	97.0	90.8
Italy	87.4	79.7	89.5	82.0
Japan	93.3	88.1	88.1	90.9
Netherlands	97.9	94.9	112.6	102.7
Sweden	105.0	99.3	103.9	91.5
United Kingdom	102.1	99.1	105.7	101.7
United States	120.6	123.1	123.1	133.7
	Working-age population (aged 20-64)			
Australia	105.8	119.9	119.9	121.0
Belgium	81.4	80.1	89.7	84.9
Canada	101.2	114.3	116.4	112.6
Denmark	83.1	80.7	92.3	83.5
France	93.2	92.2	96.5	94.4
Germany	68.0	79.1	82.7	76.1
Italy	69.1	62.9	73.4	65.9
Japan	76.9	72.3	72.3	72.3
Netherlands	79.4	77.5	96.0	87.2
Sweden	95.3	87.7	95.8	80.1
United Kingdom	90.9	89.7	95.8	90.1
United States	108.1	115.3	115.3	123.6
	Old-age dependency ratio			
Australia	225.6	199.2	199.2	196.2
Belgium	178.2	190.1	182.8	190.9
Canada	229.6	212.9	214.4	216.6
Denmark	191.6	194.3	184.8	209.7
France	178.6	177.5	184.1	183.7
Germany	234.4	207.2	210.7	225.1
Italy	218.1	240.4	221.5	237.6
Japan	203.5	216.4	216.4	249.8
Netherlands	238.4	256.4	219.5	234.2
Sweden	151.9	176.7	157.8	196.1
United Kingdom	172.8	172.0	178.4	195.1
United States	202.8	183.5	183.5	184.7

Sources : Bos, E. *et al.* (1994); Eurostat; United Nations (1998); United Nations (2001).

Table 5. Comparisons of pension spending projections and outcomes, 1980 to 1995

	Percentage change in pension spending		Percentage change in old age dependency ratio	
	Projected ¹	Actual ²	Projected	Actual
Australia	36.1	121.7	15.7	23.1
Belgium	2.6	29.0	0.2	9.4
Canada	42.1	117.4	27.0	28.2
Denmark	-0.5	62.4	-1.6	2.2
France	19.7	59.4	1.1	4.6
Germany ³	7.4	13.4	1.9	-4.2
Italy	13.5	112.1	2.5	20.4
Japan	59.5	142.4	43.7	56.2
Netherlands	20.9	30.4	9.4	11.3
Sweden	0.6	53.8	3.6	8.4
United Kingdom	0.1	81.2	-2.6	4.0
United States	16.4	60.6	7.6	13.7

1. OECD (1988).

2. OECD Social Expenditure Database.

3. Germany refers to western Germany for spending and population projections. Spending data compares the period 1980 to 1990.

Source : OECD.

Table 6. Age-related spending
(Levels in per cent of GDP, changes in percentage points)

	Total age-related spending ¹			Old-age pension spending		
	Level 2000	Change 2000-peak ²	Change 2000-50	Level 2000	Change 2000-peak ³	Change 2000-50
Australia	16.7	5.6	5.6	3.0	1.6	1.6
Austria ⁴	10.4	4.6	2.3	9.5	4.3	2.2
Belgium	22.1	5.4	5.2	8.8	3.7	3.3
Canada	17.9	8.7	8.7	5.1	5.8	5.8
Czech Republic	23.1	6.9	6.9	7.8	6.8	6.8
Denmark ⁵	29.3	7.3	5.7	6.1	3.6	2.7
Finland	19.4	8.5	8.5	8.1	4.8	4.8
France ⁶	..	..	..	12.1	4.0	3.9
Germany	..	..	..	11.8	5.0	5.0
Hungary ⁷	7.1	1.6	1.6	6.0	1.2	1.2
Italy	..	..	..	14.2	1.7	-0.3
Japan	13.7	3.0	3.0	7.9	1.0	0.6
Korea	3.1	8.5	8.5	2.1	8.0	8.0
Netherlands	19.1	10.1	9.9	5.2	5.3	4.8
New Zealand	18.7	8.4	8.4	4.8	5.7	5.7
Norway	17.9	13.7	13.4	4.9	8.2	8.0
Poland ⁷	12.2	-2.6	-2.6	10.8	-2.5	-2.5
Spain	..	..	..	9.4	8.0	8.0
Sweden	29.0	3.4	3.2	9.2	2.2	1.6
United Kingdom	15.6	0.8	0.2	4.3	0.0	-0.7
United States	11.2	5.5	5.5	4.4	1.8	1.8
Average of above countries	16.9	5.9	5.5	7.4	3.8	3.4
Average of above countries providing all or nearly all spending components ⁸	18.7	7.2	6.9			

1. Includes old-age pension expenditures and other, but not necessarily all, age-related expenditures.

2. The peak values are in 2050 except for Denmark (2030), Sweden and the United Kingdom (2035), and Belgium, Norway, the Netherlands and Korea (2040).

3. The peak values are in 2050 except for Japan (2015), the United Kingdom and Italy (2030), the United States, Sweden, Austria, Denmark and France (2035) and the Netherlands, Norway and Belgium (2040).

4. Total pension spending refers to old-age pensions and "other" pension spending which does not fall within the headings shown in this table or Table 8. This represents 0.9 per cent of GDP in 2000 and rises by 0.1 percentage point in the period to 2050.

5. Total includes other age related spending not classifiable under the headings shown in this table and Table 8. This represents 6.3 per cent of GDP in 2000 and increases by 0.2 percentage points from 2000 to 2050.

6. For France, the latest available year is 2040.

7. Total includes old-age pension spending and "early retirement" programmes only.

8. Includes Australia, Belgium, Canada, Czech Republic, Denmark, Finland, Korea, Japan, Netherlands, New Zealand, Norway, Sweden, United Kingdom and United States.

Source : OECD (2001a).

Table 7. **Decomposition of changes in old-age pension spending: 2000-2050**¹

(Level in per cent of GDP, changes in percentage points)

	Old-age pension spending		Contributions of :			
	Level in 2000	Change from 2000 to 2050	Old-age dependency ratio	Employment ratio	Benefit ratio ²	Eligibility ratio
Australia	3.0	1.6	2.5	-0.1	-0.5	-0.2
Austria	9.5	2.2	7.6	-1.9	-1.1	-2.4
Belgium	8.8	3.3	4.7	-0.7	-1.6	1.0
Canada	5.1	5.8	5.1	0.0	-0.6	1.3
Czech Republic	7.8	6.8	8.2	-0.8	-0.1	-0.1
Denmark	6.1	2.7	2.7	-0.3	-1.5	1.7
Finland	8.1	4.8	5.2	-0.1	-0.2	0.0
France ³	12.1	3.8	7.6	-0.5	-3.4	0.4
Germany	11.8	5.0	6.4	-0.7	-2.7	2.1
Hungary	6.0	1.2	2.9	-1.0	-0.3	-0.4
Italy ⁴	14.2	-0.3	10.1	-3.2	-5.5	-1.5
Japan ⁴	7.9	0.6	5.1	-1.2	-3.9	0.9
Korea	2.1	8.0	4.8	-1.0	0.2	5.0
Netherlands	5.2	4.8	3.8	-0.5	0.2	1.4
New Zealand	4.8	5.7	4.7	-0.1	1.0	0.0
Norway	4.9	8.0	3.0	0.1	3.9	1.2
Poland	10.8	-2.5	7.3	-1.3	-5.9	-2.1
Spain	9.4	8.0	8.6	-2.6	0.0	2.0
Sweden ⁴	9.2	1.6	3.9	-0.5	-2.1	0.4
United Kingdom ⁴	4.3	-0.7	1.7	0.1	-2.5	0.1
United States	4.4	1.8	2.4	-0.1	-0.2	-0.3
Average of above countries ⁵	7.4	3.4	5.2	-0.8	-1.3	0.5

1. See Dang *et al.* (2001, forthcoming) for methodology and detailed information on the time profile. Columns do not add up because linear approximations are used.

2. The associated percent declines in average benefits relative to average productivity over the period 2000 to 2050 is particularly important in the following countries: Belgium (-16), Denmark (-11), France (-21), Germany (-20), Italy (-30), Japan (-38), Poland (-51), Sweden (-22) and the United Kingdom (-47) per cent. All other countries are under 10 per cent except Norway where the average benefit is projected to rise by 53.6 per cent.

3. For France, data are available for 2040.

4. For these countries information on the number of pension recipients and average pensions was not available. These variables were estimated by the OECD Secretariat except for Italy, where data refer to the number of pensions and not the number of pensioners.

5. Average excludes countries where national information is not available.

Source: OECD (2001a).

Table 8. Other age-related spending
(Levels in per cent of GDP, changes in percentage points)

	"Early retirement" programmes			Health care and long-term care			Child/Family benefits and education		
	Level 2000	Change 2000-peak ¹	Change 2000-50	Level 2000	Change 2000-peak ²	Change 2000-50	Level 2000	Change 2000-peak ³	Change 2000-50
Australia	0.9	0.2	0.2	6.8	6.2	6.2	6.1	0.0	-2.3
Austria	..	..	..	..	..	..	..	..	..
Belgium	1.1	0.1	0.1	6.2	3.0	3.0	6.0	0.0	-1.3
Canada	..	..	..	6.3	4.2	4.2	6.4	0.0	-1.3
Czech Republic	1.8	-0.7	-0.7	7.5	2.0	2.0	6.0	..	-1.2
Denmark	4.0	0.8	0.2	6.6	2.7	2.7	6.3	0.3	0.0
Finland	3.1	-0.1	-0.1	8.1	3.8	3.8	..	..	..
France ⁴	..	..	..	..	..	..	..	..	..
Germany	..	..	..	..	..	..	..	..	..
Hungary	1.2	0.3	0.3	..	..	..	..	..	..
Italy	..	..	..	..	..	..	..	..	..
Japan	..	..	..	5.8	2.4	2.4	..	..	..
Korea	0.3	0.0	0.0	0.7	0.8	0.5	..	..	..
Netherlands ⁵	1.2	0.4	0.4	7.2	4.8	4.8	5.4	0.1	0.0
New Zealand	..	..	..	6.7	4.0	4.0	7.2	0.0	-1.3
Norway	2.4	1.6	1.6	5.2	3.5	3.2	5.5	0.5	0.5
Poland	1.4	0.2	-0.1	..	..	..	..	..	..
Spain	..	..	..	..	..	..	..	..	..
Sweden	1.9	-0.2	-0.4	8.1	3.2	3.2	9.8	0.0	-1.2
United Kingdom	..	..	..	5.6	1.8	1.7	5.7	0.0	-0.9
United States	0.2	0.3	0.3	2.6	4.4	4.4	3.9	0.0	-1.0
Average of above countries ⁶	1.6	0.3	0.2	6.0	3.3	3.3	6.2	..	-0.9

1. The peak values are in 2050 except for Belgium and Denmark (2025), Finland (2010), the Netherlands (2020), Poland (2035) and Sweden (2005).

For Czech Republic the highest level is in 2000.

2. The peak values are in 2050 except for Denmark and Korea (2035), Norway (2040) and the United Kingdom (2040).

3. The entry "0.0" indicates the highest level is in 2000. The peak values are in 2035 for Denmark and in 2040 for Norway and the Netherlands.

4. For France, the latest available year is 2040.

5. "Early retirement" programmes only include spending on persons 55+.

6. Average excludes countries where information is not available.

Table 9. **Spending and the primary balance**

(Per cent of GDP and changes in percentage points)

	Primary Deficit (-) / Surplus (+)				
	Total primary spending		Primary balance		
	Level 2000	Change 2000- 2050	Level 2000	Change 2000-2050	<i>Change in old-age pension spending only</i> ¹
Panel A. Countries reporting age-related spending items in addition to old-age pensions					
Belgium	41.3	4.3	6.8	-4.2	-2.4
Canada	29.0	8.2	9.7	-9.4	-6.6
Czech Republic	41.9	6.8	-2.4	-6.8	-6.7
Denmark	48.3	5.7	4.3	-4.0	-1.0
Finland	41.9	8.5	5.5	-10.2	-6.4
Japan	32.3	3.0	-2.9	-2.9	-0.5
Korea	25.6	8.4	2.5	-10.2	-9.7
Norway	43.2	16.5	6.6	-17.0	-10.5
Netherlands	42.7	10.1	4.2	-6.9	-1.8
New Zealand	34.9	11.2	3.2	-10.3	-7.5
Poland ²	39.1	-2.2	-0.9	1.0	1.3
Sweden	52.2	3.6	4.3	-7.0	-5.4
United Kingdom	36.1	1.2	4.0	-1.5	-0.6
United States ³	25.5	4.9	4.2	-5.2	-1.6
Average for countries above	38.1	6.4	3.5	-6.8	-4.2
Panel B. Countries reporting old-age pension spending only					
Germany	44.4	5.0	2.4	..	-2.2
Italy	42.0	-0.3	5.0	..	0.2
Spain	37.0	8.0	3.2	..	-8.0
Average for countries above	41.1	4.2	3.5	..	-3.3

.. Refers to unavailable data.

1. Changes in the primary balance holding age-related spending other than old age pensions constant.

2. For Poland, total includes old-age spending and "early retirement" spending only.

3. Projections for revenues do not include the recent tax reduction in the United States.

Source : OECD (2001a).

Table 10. **The fiscal impact of ageing in a "stylised" country, 2000-2050**¹

(variables as a share of GDP and changes in percentage points)

	Change in:		Difference relative to baseline
	Primary balance	Net debt	
Baseline			
Impact of all age-related spending on the "stylised" country	-6.1	-95.8	
-- Impact abstracting from initial debt and primary surpluses ²	-6.1	-210.1	
-- Impact of initial and sustained primary surpluses ³		114.8	
Impact of pension spending alone ⁴	-4.2	-74.0	22.0
Policy simulations			
Sustained primary deficit of 1 per cent of GDP ⁵	-6.1	-435.4	-339.6
Primary surpluses disappear after 10 years	-8.6	-274.2	-178.4
Sensitivity test			
Sustained increase in the primary surplus of 1 percentage point of GDP ⁶	-6.1	-1.2	97.0
Age-related spending is 1 percentage point lower in 2050	-5.1	-61.8	34.0
Initial debt is 10 percentage points lower	-6.1	-74.9	20.9
Real interest rates are one percentage point lower	-6.1	-60.6	35.2

1. The "stylised" country has pension spending equal to 8 per cent of GDP, a primary surplus of 2.5 per cent and net debt to 55 per cent of GDP. This country experiences an ageing-related shock measured by the median value in country submissions for the number of pensioners, average pensions, health-care spending and other age-related spending over the period.

2. Initial debt and primary balances, excluding the effects of ageing, are set to zero.

3. Assumes that age-related spending increases in line with GDP.

4. Assumes that other age-related spending increases in line with GDP.

5. The primary deficit is assumed to be 1 per cent of GDP initially (compared to a surplus of 2.5 per cent in the baseline). The deficit is assumed to remain constant over the period, excluding the effect of ageing. The impact of ageing is then introduced in this new baseline.

6. Increase throughout the period from 2000 excluding the effect of ageing. The impact of ageing is then introduced in this new baseline.

Source : OECD (2001a).

Table 11. Policy measures in a "stylised" country to keep the year 2000 debt to GDP ratio constant ¹

	Year policy measure takes effect:		
	2005 ²	2015 ²	2025 ²
Reduction in average pension benefits (per cent)	17.3	21.3	29.9
Reduction in the number of pension beneficiaries (per cent)	7.7	9.5	12.3
Increase in the primary surplus needed to keep debt constant at the level in 2000 (per cent of GDP) ³	1.1		
Memorandum item:			
Increase in the primary surplus needed to eliminate all debt by 2050 (per cent of GDP) ³	1.8		

1. The "stylised" country has pension spending equal to 8 per cent of GDP, a primary surplus of 2.5 per cent and net debt to 55 per cent of GDP. This country experiences an ageing-related shock measured by the median value in country submissions for the number of pensioners, average pensions, health-care spending and other age-related spending over the period.
2. The reduction is fully implemented in the corresponding year and sustained through the period.
3. The surpluses are sustained throughout the period.

Source : OECD (2001a).

Table 12. Average impact of sensitivity tests on total age-related spending: 2000-2050 ¹

(Percentage points of GDP)

	Old-age pensions	Total age-related spending		Old-age pensions	Total age-related spending
Increased longevity (+3 years for males and +2 years for females relative to baseline)	1.0	1.4	Fall in unemployment rates (decline to levels experienced in late 1960s)	-0.2 ²	-0.4 ²
Higher fertility (+15% relative to baseline)	-0.7	-0.7	Higher older worker participation rates (5 percentage points higher by 2050 relative to baseline)	-0.3	-0.5
Higher immigration (+50% by end of period relative to baseline)	-0.4	-0.7	Higher female participation rates (5 percentage points higher in 2050 relative to baseline)	-0.3	-0.5
Increase in labour productivity growth (increase in growth rate by 1/2 point relative to baseline)	-0.5	-0.6 ³			

1. Averages across the following countries: Belgium, Canada, the Czech Republic, Denmark, France, Germany, Italy, Japan, the Netherlands, Poland, Spain, Sweden and the United States. However, certain of these countries did not provide all of the sensitivity tests. For further details see Dang *et al.* (2001, forthcoming). Results are defined relative to baseline at the end of the period.

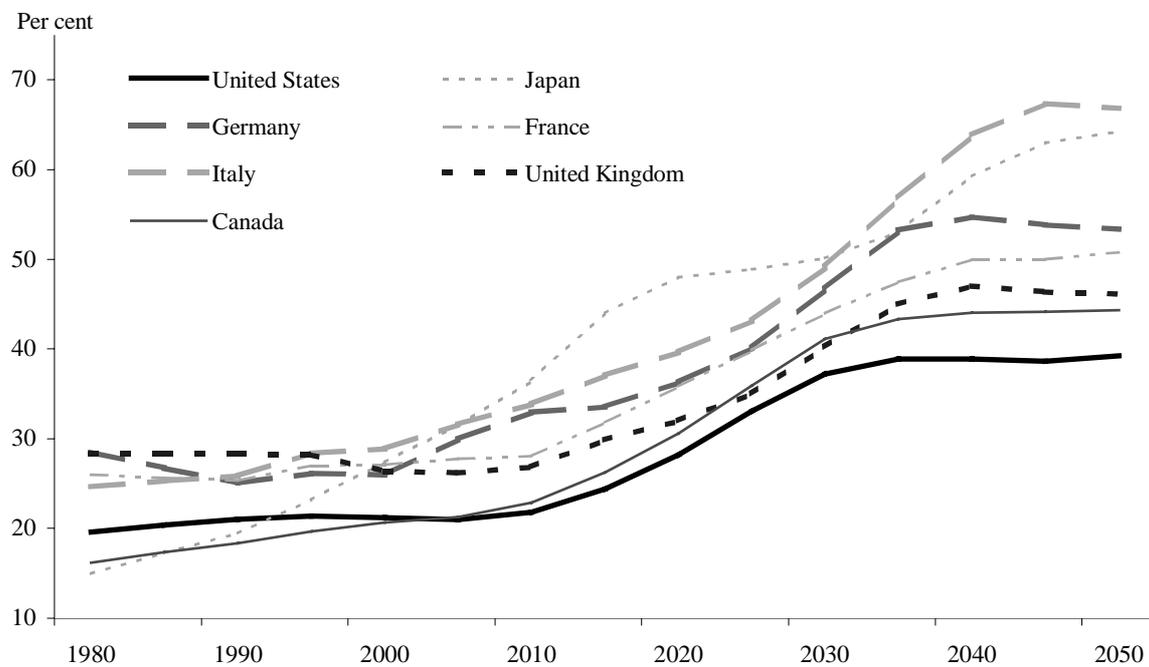
2. This indicates the impact relative to baseline. However, the baseline projections included some decline in unemployment rates particularly for Belgium, Italy, France and Spain, so that the impact of the total fall in unemployment over the period would be larger than reported here.

3. Excluding the Czech Republic and the United States because projections of spending on health and long-term care and education are insensitive to the change in productivity growth in these two countries, i.e. lower productivity growth does not lead to a fall in wage growth relative to baseline in these two countries.

Source : OECD (2001a).

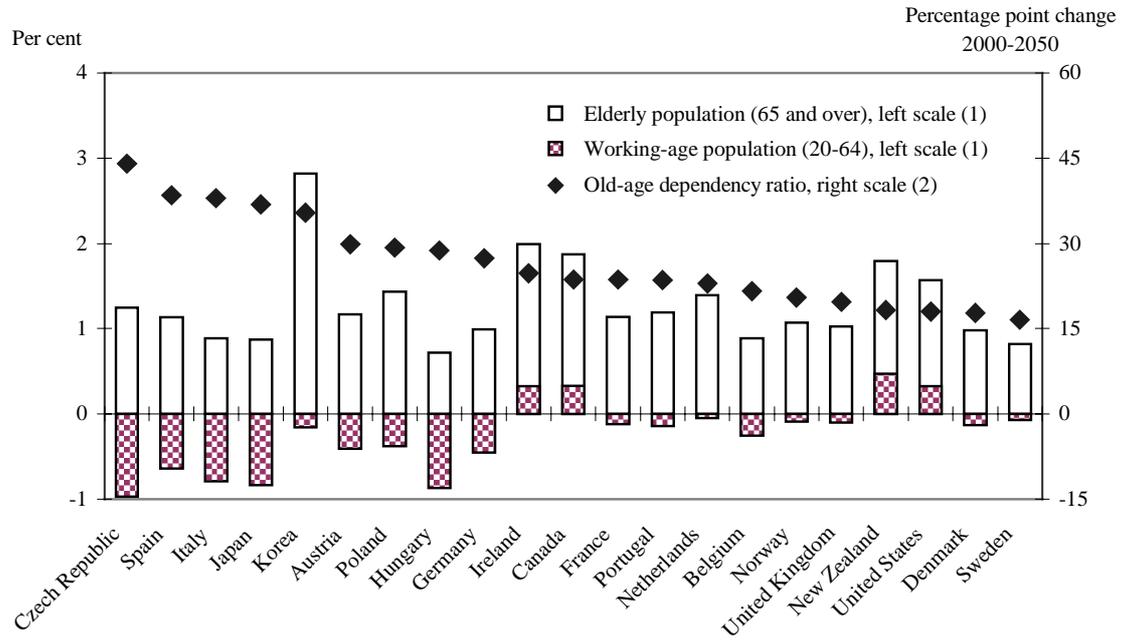
Figure 1. Old-age dependency ratios in G7 countries

Population aged 65 and over as a percentage of the working-age population (aged 20-64)



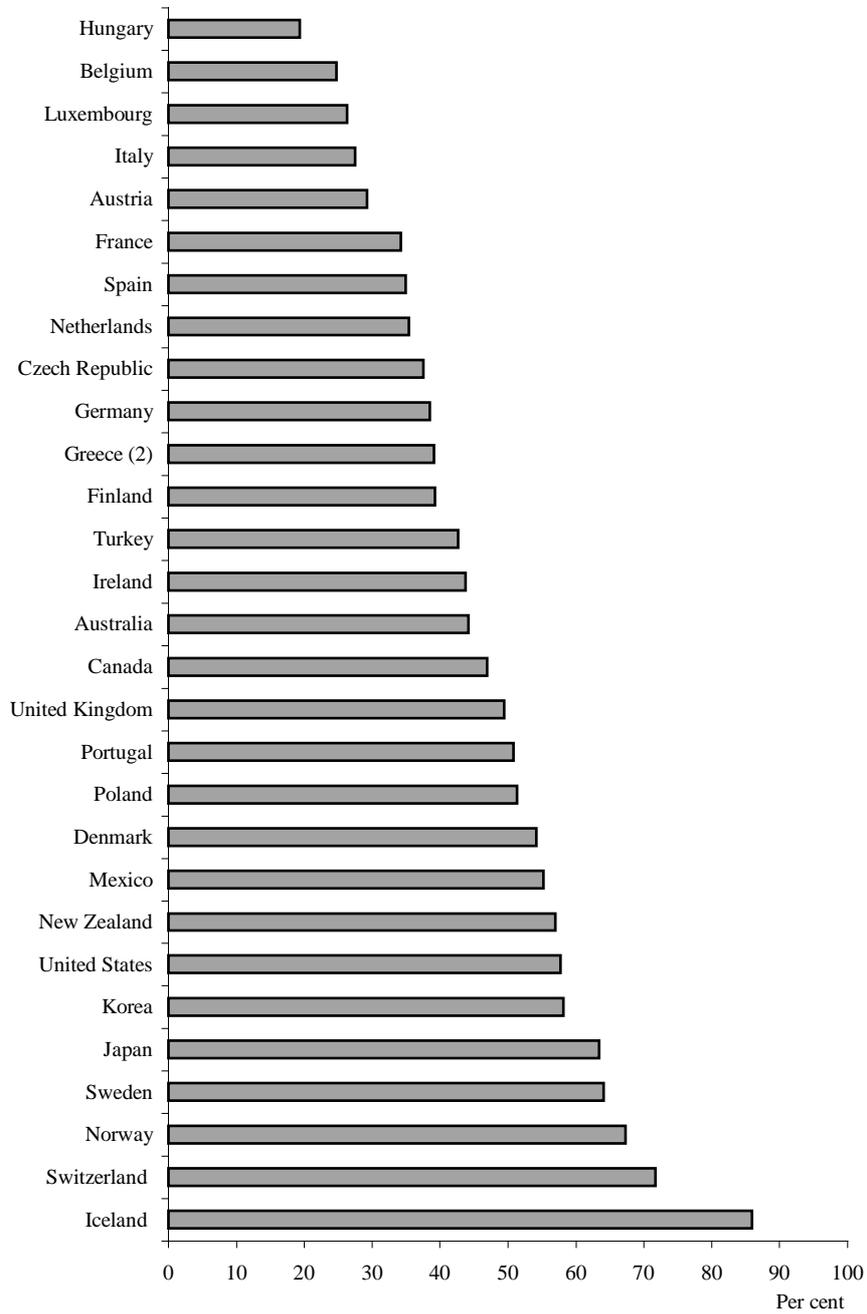
Source : Eurostat; United Nations (1998).

Figure 2. Decomposition of the change in the old-age dependency ratio, 2000-2050



1. Annual average per cent change over the period 2000-2050.
2. Percentage point change in the old-age dependency ratio over the period 2000-2050.

Figure 3. **Employment rate of older workers in OECD countries, 1999** ¹



1. Employment of workers aged 55-64 as a percentage of the population aged 55-64.

2. 1998 data.

Source: OECD Labour Force Statistics .