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Can we afford to grow old?

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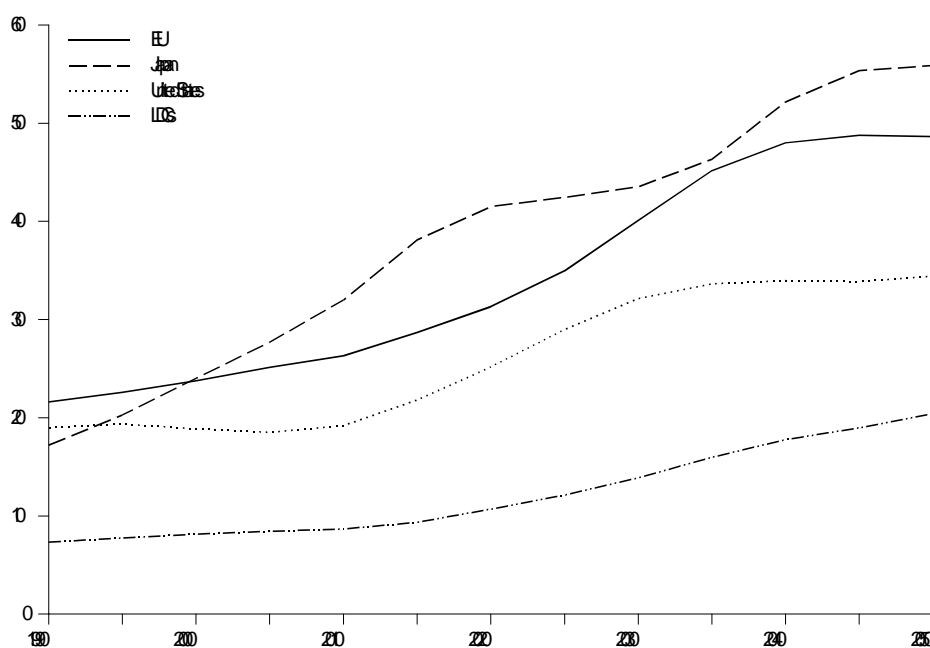
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INTRODUCTION

OECD countries will experience rapid aging of the population in the near future. These demographic trends provide serious challenges for the systems of social security, pensions and health care, particularly in the second quarter of the next century. By then, the large post-war babyboom generation will draw on these systems while the relatively small baby-bust generations born after 1975 will make up the labor force. Indeed, old-age dependency ratios are projected to rise rapidly in the decades to come (see Figure 1).

Figure 1 Old age dependency ratios in the USA, LDC's, the EU and Japan, 1990-2050^a



Source: United Nations (1994).

^a Population 65+ / Population 15-64 * 100.

This paper focuses on the consequences of aging for the systems of income support in old age, including pension design and retirement policies, rather than for health care,

housing, and social care services. It analyses these effects in a broad economic perspective. In particular, it considers not only aging but also non-demographic trends that affect the future of income support in old age. These trends include globalization, technological change, individualization and more heterogeneous tastes and needs. Indeed, these trends are likely to be as important as the aging of the population in determining the future of old-age income insurance.

In analysing aging, we take also a broad perspective. Indeed, aging provides opportunities and challenges. Opportunities are a more experienced labor force as well as longer and more healthy lives. The main economic challenges are fourfold. First, an *intertemporal* transfer problem involving the level and composition of saving. How much resources should society transfer to the future in order to ensure an adequate standard of living when the babyboom generation retires? Should it transfer these resources in the form of physical capital, human capital, or other intangible capital? Should saving occur through the private or public sector? The second challenge involves an *international* transfer problem. Can OECD countries benefit from trade with the non-OECD countries, which will age only later? How should these international transfers take place? The third challenge is a *fiscal* transfer problem: How can OECD countries contain the pressure on their public finances as aging raises spending and reduces tax revenues? Will transferring resources from the private to the public sector become prohibitively expensive? The final related challenge is to contain differences in standard of living, both within and across generations, through intra- and intergenerational risksharing.

This paper investigates how OECD countries can address these challenges posed by major demographic and other trends. Section I explores the strengths and weaknesses of various pension systems in the light of future trends. Section II illustrates the major uncertainties surrounding these trends by providing scenarios for the main future trends affecting old-age income support. To diversify risks, OECD countries should act on several fronts in order to prepare their economies for the aging of their populations. Section III outlines two major ways to deal with these demographic and other trends, namely, first, investing in human capital and, second, investing in tangible and other intangible capital. Within each of these main lines of attack, several policy measures are suggested. Indeed, also in exploring policy options, we take a broad approach. Whereas several of these policy measures involve social security and pension systems, other suggested measures effect the economy more generally. Section IV concludes.

I. STRENGTHS AND WEAKNESSES OF VARIOUS PENSION SYSTEMS

Three types of pension schemes can be distinguished: Pay-as-you-go (PAYG), defined-benefit (DB), and defined-contribution (DC) schemes. At one end of the spectrum of

pension schemes are PAYG systems. These schemes pay retirement benefits out of premiums collected on the labor income of the young. In the absence of capital funding, these schemes typically imply substantial intergenerational transfers. Depending on the benefit and premium formula used, they generally also redistribute resources within generations. These schemes are provided by the government, which can enforce the benefit promise and the associated redistribution through its tax powers.

DC schemes are at the other end of the spectrum. In contrast to PAYG plans, these schemes are not redistributive – neither *within* nor *across* generations¹. Indeed, individual retirement benefits are directly related to individual contributions. At any point in time, accumulated capital corresponds to the discounted value of future retirement benefits. These schemes can be provided by the market as either personal or occupational pension schemes.

DB schemes can be considered as a mixture of PAYG and DC schemes. These schemes are typically provided as occupational schemes by firms. Just like DC schemes, DB systems employ capital funding. However, in contrast to DC schemes, benefits are based on salary levels in the period preceeding retirement rather than on the discounted value of individual life-time contributions. Indeed, besides accumulating capital, the funds levy premiums on the younger working members of the scheme to finance benefits of the older workers and the retired². In this way, the plans, in fact, employ a mixture of capital funding and pay-as-you-go financing. Compared to DC schemes, property rights of individual workers are less well defined. Funding rules are rather arbitrary because they depend on subjective expectations about various variables, including future investment returns. Firms can perform the redistributive activities associated with the benefit promise in DB schemes only in less than perfectly competitive product and labor markets.³ Indeed, employers may use DB schemes as an instrument to alleviate market imperfections in labor markets (see sub-section I.4).

¹These schemes are not redistributive ex ante and are thus actuarially fair. However, if these plans provide annuities, they insure against longevity risk. Hence, they redistribute incomes ex post away from short-lived individuals to long-lived ones.

²In particular, wage increases result in considerable additional pension obligations with respect to older workers. The costs of these so-called backservice obligations are spread over all workers.

³Also government regulations may help occupational schemes to perform inter- and intragenerational redistribution by making collective labor agreements compulsory for particular sectors. Moreover, to prevent adverse selection, workers in a particular firm must be forced to participate in DB schemes.

The rest of this section explores the strengths and weaknesses of the three types of pension schemes. In doing so, it pays attention to intergenerational risksharing, the relative returns on human and financial capital, vulnerability to demographic shocks and political risk, poverty alleviation and incentives to save and work, freedom of choice, and administrative costs. Box 1 summarizes the strengths and weaknesses of the various schemes.

Box 1 Strengths and weaknesses of pension systems

	Pay-As- You-Go	Defined- Benefit	Defined- Contribution
Insurance against			
– intergenerational inequities	+	+	–
– demographic shocks	–	0	+
– low return on human capital	–	0	+
– low return on financial capital	+	0	–
– political risks	–	0	+
Strong incentives to:			
– save	–	0	+
– work	–	0	+
– invest in human capital	–	+	0
Efficient allocation of labor (portability of claims)	+	–	+
Poverty alleviation	+	–	0
Low administrative costs	+	+	0
Individual choice of participation and pension level	–	–	+

1. Intergenerational risksharing
PAYG and DB schemes

The main potential strength of PAYG and DB schemes is intergenerational risksharing in the face of major long-term macro-economic risks, including investment risks due to depressions, wars, natural disasters, inflation, financial crisis, etc. In DC schemes, the

elderly are fully exposed to these investment risks. In PAYG schemes, and to a lesser extent in DB schemes, in contrast, shocks can in part be shifted to the young in the form of changes in the premium rate. This intergenerational risksharing aimed at protecting the incomes of the elderly can be efficient because the young are generally better able to adapt to changes in wealth than the old, who feature only limited human capital and a short planning horizon. Indeed, the elderly tend to be rather risk averse.

The market cannot provide risksharing among non-overlapping generations. In particular, generations that are not yet born cannot commit to a risksharing arrangement. Moreover, by the time generations can commit to such a contract, they know part of the outcome. Through its power to tax, the government has the power to commit generations to a risksharing arrangement (see Smith (1982) and Gordon and Varian (1988)). Social security can pool also risks of variable returns to human and non-human capital. Without government intervention, individuals face excessive human-capital risk early in their lives because human capital cannot be traded. The elderly, in contrast, are fully exposed to investment risks on non-human capital providing for retirement income. Merton (1983) shows how social security allows generations to trade risks.

The particular risksharing features of PAYG and DB schemes depend on the benefit and premium formulas, including the indexation provisions for benefits. In any case, since pension benefits are financed out of wages of the young, PAYG schemes can ensure that the standard of living of the elderly is not too far out of line with the incomes of the young. In this way, PAYG systems may prevent large disparities in standards of living between various generations.

PAYG schemes are particularly attractive if rapid growth of wages causes the younger generations to be relatively affluent compared to the older generations. Indeed, many OECD countries introduced PAYG systems after the second world war when the young benefited from rapid productivity growth while the depression and the war had left many elderly desolate. At the same time, many informal inter-family mechanisms of intergenerational risksharing weakened.

DC schemes

DC schemes are vulnerable to a low return on capital, which may be caused by a variety of factors. For example, financial markets may be inefficient. Furthermore, aging may reduce the return on capital by rendering capital more abundant relative to labor. In particular, the inflationary pressures induced by the scarcity of labor may erode the real value of nominal pension benefits.

The additional investment risk borne by the individual in the DC schemes has potential implications for the investment strategy of pension funds. In particular, compared to DB schemes, DC plans must pursue a more cautious investment strategy because individual members are less able to bear investment risk than a DB plan, which

can pool risks across generations. This reduces the efficiency of DC plans in delivering pension benefits by reducing the average return.

How serious these weaknesses of DC schemes are depends not only on investment risks but also on the functioning of financial markets. The more efficient financial markets become, the higher the returns on capital can be. Moreover, financial innovation and globalization of financial markets may produce more sophisticated financial instruments that provide a better hedge against inflation (e.g., indexed bonds) and other macro-economic investment risks.⁴ Moreover, the government may provide some insurance through the tax system (see section III.1.a).

2. Vulnerability to political risk

PAYG schemes

PAYG schemes can be seen as part of an implicit contract between generations. The older generations raise the younger generations. By financing the education of the young, the elderly invest in the human capital of the young. The elderly provide the young also with public capital goods, such as a clean natural environment, public infrastructure, and most importantly, knowledge. The ideas generated by the older generations enhance the productivity of the young. Indeed, the younger generations stand on the shoulders of the old. In return for this service, the older generations expect the younger generations to transfer part of the return on this investment to them when they are retired, (see e.g. Razin and Sadka (1995)).

Whereas PAYG systems are less vulnerable to investment risk than DC schemes, they are likely to be more vulnerable to political risk. Indeed, the implicit intergenerational contract between generations may break down as individualization erodes intergenerational altruism. Without intergenerational altruism, the implicit intergenerational contract is vulnerable to the so-called hold-up problem. All generations would benefit from a contract stipulating that the older generations educate the young and bequeath public assets (such as a clean natural environment and knowledge) while the younger generations take care of the older generations during retirement by insuring these latter generations against adverse income shocks. However, in the absence of intergenerational altruism, the younger generations can not credibly commit to such a contract if, when they grow up, they gain in economic and political power at the expense of the older generations. Indeed, when the younger generations are in middle age and have to return the favor to the older generations, they have an incentive to exploit their stronger political and economic position vis-à-vis the older generations by refusing to transfer

⁴ See World Bank (1995, Brief 10).

resources. This incentive is mitigated if they take into account that, by breaking the contract, they most probably will have to take care of their own retirement provisions.

The political risk surrounding PAYG schemes can be mitigated in several ways. One way is to ensure that the young feature a high labor productivity so that they have sufficient resources to transfer to the old. The political risks can be alleviated also by reducing the stock of public debt, accumulating a trustfund, or having the elderly pay PAYG contributions on their incomes. In those ways, older generations make a tangible contribution to their own retirement. Finally, by offsetting their declining economic power, the rising political influence of the elderly due to their increased number may help to enforce the intergenerational contract.⁵

DC schemes

DC schemes are less vulnerable to political risks because they feature well-defined property rights on individual pensions. However, also these schemes may be affected by distributional and political conflicts arising from fiscal imbalances associated with aging because these conflicts may result in excessive taxes on pension wealth. For example, such conflicts may fuel inflation, which erodes the real value of nominal retirement benefits. In view of the long time horizon involved, these political risks can in fact be substantial. Indeed, DC schemes seem to be most attractive in an environment with stable macroeconomic policies.

DB schemes

As a mix of DC and PAYG plans, DB schemes may suffer from political risk as individual property rights on assets tend to be ill-defined. Indeed, DB-schemes tend to feature implicit rather than explicit contracts as the benefit promise is backed up not only by financial assets but also by the reputation and market power of the firm and solidarity of future workers. Hence, DB schemes seem particularly attractive in corporatist settings in which workers trust firms to carry out commitments in implicit contracts.

Aging makes the commitment of firms to DB schemes (and age-related pay schemes in general) less credible. In particular, an older labor force makes these schemes more expensive to maintain. Hence, firms may decide to discontinue these schemes, especially if markets become more competitive.

3. Compulsion and administrative costs

⁵ In fact, the political power of the elderly may become so strong that the intergenerational contract breaks down because the elderly fail to invest sufficient resources in the young.

PAYG and DB schemes

PAYG schemes, and to a lesser extent DB schemes, require compulsory participation under rather uniform conditions. If individuals were free to opt out or select their own pension packages, adverse selection would erode intra- and intergenerational risksharing and redistribution. The limitations on individual choice amount to an implicit tax and generate welfare losses. These welfare losses are larger, the less homogeneous the population and thus the more heterogeneous tastes for pension benefits become.

DC schemes

DC schemes leave more scope for individual choice and can cater better to the specific needs and preferences of each individual participant. However, individual choice implies higher transaction costs. In the Netherlands, for example, the nation-wide public pension scheme charges only about 1 percent of the contributions to cover the operating costs. Insurance companies providing personal pension schemes, in contrast, may charge as much as 25% of the premium. Indeed, individual pensions are complex products. Hence, salespersons may mislead ill-informed customers about the merits of specific DC plans. Compared to individual DC schemes, compulsory DC and DB schemes involve prearranged workers, thereby mitigating transaction costs. Indeed, here is a trade off between exploiting economies of scale and scope (in uniform pension plans) and tuning pensions to specific needs through product differentiation (in personal pension plans).

Leaving individuals completely free to select their own personal pension provisions may harm welfare. If individuals are myopic, they may leave insufficient resources for retirement. Moral hazard may cause rational agents to save inefficiently low amounts for retirement in order to exploit means-tested retirement provisions provided by the state. Adverse selection may prevent individuals with high mortality risk from obtaining actuarially fair insurance against longevity risk.

Regulations requiring workers to take out pension schemes are one way to deal with myopia, adverse selection, and moral hazard. By regulating fiduciary standards and investment portfolios, governments may want to protect ill-informed and myopic workers. Regulation must walk a fine line between, on the one hand, adequately protecting workers but, on the other hand, leaving workers and pension funds enough flexibility to meet specific needs. This trade-off depends on how heterogeneous societies are and how well educated workers can be trusted to make responsible decisions over a long time horizon.

4. Insurance, poverty alleviation, and incentives

PAYG schemes and poverty alleviation

The intergenerational transfers associated with intergenerational risksharing imply that PAYG benefits are not actuarially fair. Accordingly, for a generation as a whole, the discounted retirement benefits do not match the contributions. The distortions implied by the associated tax or subsidy depend on the precise pension and contribution formulas. In setting these formulas, policymakers face a trade-off between, on the one hand, efficiency by keeping marginal tax rates low, and on the other hand,

Box 2 Poverty alleviation, tagging, and incentives

How much the two objectives of poverty alleviation and old-age insurance conflict depends on income heterogeneity within generations compared to heterogeneity across generations. Paying public benefits and providing tax privileges to all elderly irrespective of income is appropriate from the point of view of not only old-age insurance but also poverty alleviation if the old are an homogeneous group that is poorer than the young. However, if the pensioner income distribution widens, if slow growth of low-skilled wages causes poverty among young workers, and if aging narrows the contribution base, these policies favoring the old would become less effective in alleviating poverty. Indeed, sizable amounts of public spending would accrue to elderly collecting high incomes, especially because the rich tend to live longer than the poor.¹ The costs of these funds would be born by young workers in poverty.

If the income distribution within any generation becomes more heterogeneous, the government has to supplement information on age with information on income to determine which people are poor. Consequently, if it wants to alleviate poverty through the pension system, the government has to transfer resources from rich to poor pensioners. This implies that the link between individual premiums and benefits in pension schemes becomes less tight. Accordingly, PAYG contributions are perceived as a tax rather than a price paid for a future pension benefit. As a direct consequence, the pension scheme discourages labor supply and saving. The associated distortions worsen the trade-off between efficiency and equity. Indeed, poverty alleviation becomes more expensive.

Whereas compulsory funded saving schemes for workers alleviate the saving distortion, they worsen the labor-supply distortion; even if workers are forced to save part of their labor incomes, they can still escape pension contributions by working less. Moreover, compulsory pension premiums can raise wage costs of the low skilled. The adverse effects on employment can give rise to a vicious circle. Lower employment erodes the contribution base of the PAYG pensions, requiring even higher tax rates to maintain the level of benefits.

Box 2 Continued

If age is no good indicator for poverty, the government may want to employ no age information at all so that poverty alleviation among the old is integrated with poverty alleviation for the population at large. However, means-tested benefits impose higher administrative costs, may cause limited take-up due to stigmatizing effects, and distort saving and labor supply. Accordingly, countries may want to continue to use a mix of income and age information (i.e. 'tagging') when identifying those in need of public support¹. The literature on optimal tax and benefit structures suggests that the optimal structure may be a flat benefit for all the elderly that is clawed back at higher incomes through the tax system (see, e.g., Dilnot et al. (1994)). As the number of richer pensioners increases, the case becomes stronger for having the high marginal withdrawal rate start further down the income distribution in order to prevent large amounts of public money from accruing to affluent pensioners. Accordingly, as the older generation becomes more heterogeneous, countries may want to reconsider tax privileges and public benefits that are granted to the richer elderly.

¹ Providing more public transfers to the elderly poor than the younger poor is attractive because the adverse incentive effects on labor supply of the elderly are relatively small. Moreover, political support for transfers to the elderly is likely to be stronger because the elderly tend to be more vulnerable to shocks and are less able to adapt to new circumstances. Furthermore, transfers may be targeted at some well-defined subgroups among the elderly, such as very old women living alone, which are particularly poor.

intragenerational equity by alleviating old-age poverty. Benefit formulas that let benefits rise with life-time earnings may contain marginal tax rates on labor income; if not only contributions but also benefits rise with earnings, incentives to reduce labor supply to the formal sector are mitigated.⁶ However, if retirement benefits are flat or means tested

⁶ In practice, however, benefit formulas may be non-transparent so that, irrespective of the benefit formula, workers perceive pension contributions as a tax. Labor supply is curtailed also if workers discount future

and premiums rise with income, the premiums are very much like a tax distorting labor supply. However, in this case, retirement benefits may be better targeted at alleviating old-age poverty. Box 2 deals with the trade-off between poverty alleviation and incentives.

DC schemes

Voluntary DC schemes distort neither saving nor labor supply because they do not redistribute across and within generations. DC schemes are particularly attractive if society does not attach a high priority to (intra- and intergenerational) redistribution and risksharing.

Two factors determine how important labor-supply distortions due to high marginal taxes actually are. First, the elasticity of labor supply. This elasticity can be expected to rise as working, career, and retirement patterns become more flexible and diverse. The labor supply elasticity of older workers, who have the option to retire, may become particularly high (see also section III.1.a). The second factor affecting the distortions due to reduced labor supply is the marginal tax wedge on labor supply implied by other taxes and means-tested government programs. The more other government programs already distort labor supply, the more serious the additional distortions due to pension programs become.

DB schemes

Employers often adopt occupational schemes of the DB type to address labor-market failures associated with asymmetric information and lack of commitment. In particular, long vesting periods, limited indexation of pension rights for those who end participation before retiring, and linking retirement benefits to the final wage motivates workers not to shirk (when effort is costly to monitor) and binds workers to the firm (see Lazear (1986)). This reduces costs associated with monitoring, training, hiring, and firing. Moreover, a stronger commitment of the worker to the firm encourages the stakeholders of the firm (e.g., shareholders and workers) to invest more in firm-specific (human) capital.⁷

These positive incentive effects come at a price. In particular, limited portability impedes labor mobility across firms, which renders the allocation of labor less efficient and may discourage gradual retirement (see section III.1.a). Moreover, as pensions are

benefits due to myopia or lack of confidence in the sustainability of the pension scheme.

⁷In this context, explicit contracts may not be able to deal with the so-called hold up problem, where a mutual advantageous investment does not occur because parties cannot credibly commit to a contract. See Gelauff and Den Broeder (1996).

not directly related to premiums paid, premiums may distort labor supply because they are perceived as a tax. Indeed, a trade-off between *static* efficiency (i.e. using the stock of human capital efficiently) and *dynamic* efficiency (i.e. accumulating the stock of human capital) emerges. Tying benefits to *average* rather than *final* pay may improve this trade off. In any case, DB schemes seem to be particularly attractive if firm-specific investments make a stable workforce desirable and if the need to flexibly adjust the allocation of labor to unexpected shocks can be met within firms.

DB schemes may be costly also because they reduce insurance and worsen income disparities. In particular, by linking retirement benefits to wages, final-pay schemes leave workers particularly exposed to human-capital and job-mobility risk. Indeed, compared to DC schemes, DB schemes suffer from less investment risk but more human capital risk. DB schemes may feature less diversification of risk than DC schemes do; not only labor income but also retirement income depends on the individual wage level.

Whereas both public PAYG and occupational DB schemes tend to redistribute income within a generation, they tend to do so in quite different directions. Most public PAYG schemes aim at alleviating poverty. By focusing on labor-market incentives, occupational DB schemes, in contrast, tend to favour the rich (which tend to have stable jobs and fast careers) rather than the poor (which tend to suffer from high rates of job turnover).

Governments may impose regulations on DB schemes (e.g. shortening vesting periods or requiring indexation of vested rights) to enhance insurance against job mobility by improving portability.⁸ However, these regulations may induce employers to replace DB pension schemes by alternative instruments to achieve their labor-market objectives.

5. Vulnerability to demographic shocks

PAYG schemes

PAYG systems, and to a lesser extent DB schemes, are particularly sensitive to the expected decline in the worker/retiree ratio due to the expected aging of the population. Indeed, if the participation rates of the various age cohorts would remain constant, aging would cause the average worker/retiree ratio in OECD countries to decline from 3 currently to about 1½ in the course of the next five decades.

⁸ However, DB schemes may not allow full portability as funding in DB schemes is not well defined but requires arbitrary actuarial assumptions.

Fortunately, the demographic factors that cause aging provide some offsetting effects on labor supply. In particular, lower fertility tends to raise the participation rate of women while increased life expectancy may allow for a rise in the retirement age. Also market forces are likely to reduce the negative first-order effects of aging on labor supply as higher wages induced by labor scarcity raise both labor productivity growth and labor supply. For example, wage pressure can be expected to stimulate inward migration from countries with younger populations.

BOX 3 The Aaron condition

The Aaron condition (see Aaron (1966)) shows how the rate of return, the growth rate of labor productivity, and the growth rate of the labor force affect the relative merits of PAYG versus funded schemes. The long-run return to PAYG schemes depends on the growth rate of labor income determining the growth of the contribution base. The return on funded schemes, in contrast, depends on the rate of return on financial assets. Hence, in the long run, funding can offer higher retirement benefits if the rate of return on financial capital exceeds the growth rate of labor income (i.e. the sum of the growth rate of labor productivity and the growth rate of employment). However, PAYG schemes are always more favorable to the first generation because they can offer pensions benefits without having to build up assets.

The Aaron condition can be interpreted as an arbitrage condition involving the relative returns on human and financial capital. PAYG schemes rely on the human capital of the younger generations. In fact, PAYG schemes make the elderly a direct stakeholder in the human capital of the younger generations. Therefore, PAYG schemes are particularly attractive compared to funded schemes if a high growth rate of wages implies a high return on human capital while financial markets offer only low returns.

Table I.1 compares the average growth rate of wages with the average real return on capital during the seventies and eighties. In contrast to the real interest on government bonds, the return on shares substantially exceeded the growth rate of wages during this period.

Aging of the population reduces the attractiveness of PAYG by decreasing the growth rate of employment. However, aging is also likely to make labor scarcer relative to physical capital. This may raise wage growth and depress the rate of return on capital. Accordingly, the overall effect of aging on the Aaron condition is ambiguous. Moreover, non-demographic trends may impact the Aaron condition. To illustrate, the World Bank (1994) expects that enhanced international capital will boost the return on capital, thereby making funding more attractive.¹ Section II investigates the consequences of various future scenarios for the variables affecting the Aaron condition.

¹ See World Bank (1994), Brief 2, P. 300.

 BOX 3 The Aaron condition (continued)

Table I.1 Real wage growth contrasted with real returns on capital, selected OECD countries, 1971-90

Country	Real wage growth	Real average annual return on equities	Real average annual return on government bonds
Canada	1.1	5.0	1.1
Denmark	2.5	9.4	4.5
France	4.0	9.6	1.3
Germany	3.6	9.3	2.6
Japan	3.0	11.2	0.0
Netherlands	1.4	8.6	1.8
Switzerland	1.8	4.7	-1.7
United Kingdom	2.4	10.8	1.6
United States	0.1	5.9	1.2

Source : World Bank (1994).

DC schemes

Not only PAYG but also funded schemes may be vulnerable to aging. By reducing labor supply, aging makes capital less scarce compared to labor, thereby depressing the return on capital. Whereas labor mobility (i.e. inward migration) may sustain PAYG schemes in aging countries, capital mobility (i.e. capital exports) may help funded schemes in these countries to maintain high returns. By investing capital in non-OECD countries with relatively young populations and abundant labor, funded schemes can exploit the phasing differential in aging between, on the one hand, the aging OECD countries and, on the other hand, the non-OECD countries, which can be expected to age only later.

Whereas international movements of capital seem less costly than international movements of labor, sizable net capital flows may be difficult to achieve in practice. The large trade imbalances that are required to affect the capital flows may give rise to major movements in real exchange rates, yielding serious trade tensions. Moreover, political risks and inadequate information about local circumstances may inhibit capital

inflows into the non-OECD countries. Furthermore, several non-OECD countries are expected to age very rapidly in the next century (see Figure 1).

The well-known Aaron condition shows how demographic shocks, wage growth, and the return on capital impact the attractiveness of PAYG vis-à-vis funding (see Box 3).

6. Conclusions

Pension schemes serve various objectives, including poverty-alleviation and insurance against longevity and other risks in old age. Depending on the particular objective, one type of pension scheme may perform best. In particular, alleviating old-age poverty is best accomplished by a nationwide public PAYG system that provides a minimum standard of living in old age. This welfare system should be mandatory, redistributive, and can be financed from current tax revenues. Depending on income dispersion within and across generations, retirement benefits may be flat or means-tested.

Another objective is relatively uniform insurance against longevity and income risks in old age. To avoid moral hazard involving means-tested benefits, adverse selection in annuity markets, and facilitate intergenerational risksharing through DB schemes, this function may require compulsory insurance. However, the insurance scheme is not explicitly aimed at poverty alleviation. Accordingly, premiums levied on labor income can be closely linked to benefits, thereby mitigating disincentives.

In setting the mandatory level of pension insurance, the government needs to trade off, on the one hand, providing enough risksharing and, on the other hand, tuning pensions to individual needs. Setting the mandatory level too low harms inter- and intragenerational risksharing and may induce workers to exploit means-tested benefits. Setting the level too high, in contrast, forces some households to save more than they would like. The associated implicit tax distorts saving and harms employment.

Those workers who want to go beyond the mandatory level of pension insurance can use supplementary private pension plans. These plans will tend to be of the DC type. They will be particularly important for those with higher incomes in heterogeneous societies with rather diverse needs for pensions. These high income-earners are better able to deal with the investment risks associated with DC schemes.

Table I.2

Many OECD countries, including Germany, France, and Italy, have integrated the first two functions (i.e. poverty alleviation and old-age insurance) into a single comprehensive public pension system⁹ (see Table I.2). In other OECD countries, including Switzerland, Denmark, the Netherlands, and New Zealand, the second function of old age insurance is performed by occupational schemes, which may be of either the DB or DC type, or by personal pension schemes of the DC type. The World Bank (1994) argues in favour of separating the various functions in separate pillars. This would optimize the trade-off between efficiency and equity by avoiding non-transparent and perverse redistribution. Moreover, a private funded pillar would stimulate capital formation and make the pension system less vulnerable to aging. We return to this issue in section III.1.a.

II. SCENARIOS

Another important reason for adopting a mix of pension systems is to diversify macro-economic risks. Indeed, workers should not put all their eggs in one basket to avoid excessive exposure to the substantial political, investment, and human-capital risks over a long horizon. Each country should determine its own mix depending on its political preferences (e.g. for inter- and intragenerational risksharing) and the functioning of capital and labor markets. The selected mix should depend also on expectations regarding future trends (e.g. regarding future returns on physical and human capital). The scenarios in this section illustrate some of the major uncertainties that are unavoidable when workers plan over a long time horizon. These scenarios reveal also which factors and trends are relevant when a country considers the future of its own pension system.

Section II.1 provides a numerical illustration of two scenarios, focussing on the uncertainty surrounding the elements of the Aaron condition (see Box 3). It puts these scenarios in the context of the development of the world economy in general and the relative economic performance of OECD versus the rest of the world in particular. Two other scenarios for the world economy are discussed briefly. Section II.2 puts the

⁹In the academic literature, the first function is associated with the so-called *tax-transfer* approach. The second function corresponds with the *insurance* approach. The so-called *annuity-welfare* model links the welfare and insurance functions. Combining the two functions may yield economies of scale and scope. Moreover, by integrating the insurance function with the welfare function, gives income earners with middle- and higher incomes a direct interest in the public scheme. This may strengthen political support for the welfare function.

scenarios in a broader, qualitative framework by including various other trends that are of major importance in shaping the future of pension systems.

1. Numerical illustrations of scenarios

This section presents two scenarios, which are called the *market* scenario and the *intergenerational solidarity* scenario, respectively. These scenarios are differentiated on the basis of different assumptions about the return on capital, the growth rate of labor productivity, and the participation rate. These factors affect the Aaron condition (see Box 3) and are therefore important determinants of how attractive PAYG schemes are compared to funded schemes. The scenarios serve to illustrate how the considerable uncertainty about these major non-demographic variables affect the three pension systems. The scenarios assume the same demographic projections, which are based on the population projections of the United Nations for the OECD countries (see United Nations (1994) and den Ouden (1993)).

The different assumptions on the Aaron condition originate in diverging relative economic performances of the OECD region versus the non-OECD region. In the market scenario, non-OECD countries rapidly catch up with OECD countries. Increased international capital mobility allows investors in OECD countries to benefit from high returns on investment outside the OECD. At the same time, older and smaller labor forces slow economic growth in OECD countries. In the intergenerational solidarity scenario, in contrast, the OECD region benefits from rapid productivity growth as scarce labor encourages labor-saving technological progress. Growth in the non-OECD suffers from inward-looking policies. Poor investment opportunities in the non-OECD and scarce labor in the OECD depress the rate of return on capital in the OECD.¹⁰

The two scenarios show diverging economic performance of the OECD versus the non-OECD because they are constructed so as to yield extreme values for the relative return on human capital versus financial capital in the OECD countries. According to the Aaron condition, this relative return is an important determinant of the attractiveness of PAYG versus funded schemes (see Box 3).

These scenarios should not be interpreted as suggesting that the economic performances of the OECD necessarily diverges from that of the non-OECD countries.

¹⁰For a more elaborate description of the scenarios, see section II.2. One could rename the two scenarios on the basis of the diverging relative economic performances of the OECD and the non-OECD. In particular, following the names in CPB (1992), the market scenario could be relabelled as *global shift* and the intergenerational solidarity scenario as *OECD Renaissance*.

Indeed, one could easily image two other scenarios involving, respectively, low and high growth rates in the entire world (see Box 4). The low-growth scenario, which could be called *global crisis*, features low interest rates and slow wage growth. Hence, the returns on both human and financial capital would be low. In the high-growth scenario, called *rapid growth*, the situation would be reversed. Both growth rates and interest rates would be high. We do not further explore these two latter scenarios because they do not yield extreme values for the Aaron condition.

Box 4 The main features of the scenarios

	Growth performance:		OECD returns on:	
	OECD	Non-OECD	Physical Capital	Human Capital
Market	–	+	+	–
Intergenerational solidarity	+	–	–	+
Global crisis	–	–	–	–
<u>Rapid growth</u>	+	+	+	+

Table II.1 contains the inputs for the two scenarios. In the so-called market scenario, the economy is dynamically efficient in that the real rate of return on capital (i.e. 4%) substantially exceeds the real growth of labor productivity (i.e. 1%). In the intergenerational solidarity scenario, the Aaron condition is reversed. Whereas labor productivity growth is 2% in real terms, the real rate of return amounts to only 1%. The inflation rate is 3% in the market scenario and 4% in the intergenerational solidarity scenario. In the intergenerational solidarity scenario, rapid wage growth and low rates of return encourage the elderly to delay their retirement. Accordingly, the effective retirement age gradually rises from 61.6 in 1990 to 64.0 in 2075. In the market scenario, the effective retirement age remains constant.

We focus on the consequences of the various assumptions for the development of the premium level over time. To clearly identify the performance of the various schemes, we do not take into account endogenous changes in the mix of the pillars (see, however, section II.2). Indeed, the scenarios assume that the three pillars, PAYG, DB, and DC,

each account for a third of pension benefits. We separately present the results for the three pillars. Hence, the consequences of different mixes of pillars can be computed easily by attaching different weights to the results for the various pillars.

Table II.1 Input scenarios

	Market		Intergenerational Solidarity	
	1990	2075	1990	2075
level				
Retirement age	65	65	67	67
Participation rate 55-65	51.4	60.9	51.4	60.0
Effective retirement age	61.6	62.0	61.6	64.0
average growth rate per annum				
Nominal rate of return on capital		7		5
Nominal labor productivity growth		4		6
Rate of increase of consumer prices		3		4

The various pillars are modelled as follows.¹¹ The pension level at retirement amounts to 60% of final salary. Each of the three pillars pays $\frac{1}{3}$ of total pension level. After retirement, nominal benefits rise with the rate of inflation. DC and DB benefits are linked to employment history. PAYG benefits, in contrast, are paid to all citizens, irrespective of employment history. Since PAYG benefits are paid also to those outside the labor force, aggregate PAYG benefits exceed benefits paid by the other two pillars.

Tables II.2 and II.3 present the contributions and retirement benefits as a percentage of the wage sum in, respectively, the market and intergenerational solidarity scenarios. The contribution rates of the two scenarios are also presented in figures II.1 and II.2. In the market scenario, pension benefits are a higher percentage of the wage sum because real wages growth is relatively slow. Accordingly, compared to the incomes of the young, the incomes of elderly are relatively high. In the market scenario, the PAYG system is much more expensive than the funded systems. In the intergenerational solidarity scenario, in contrast, PAYG is relatively cheap. Indeed, the PAYG scheme offers higher benefits at lower premia. Moreover, the rise in the PAYG premium as a result of an increase in the old-age dependency ratio is mitigated by an increase in the age of retirement. In the intergenerational solidarity scenario, DB schemes adopt an expected

¹¹The model used is an extended version of that used in Besseling and Zeeuw (1993).

nominal rate of return of 6%, which exceeds the realized return of 5%. Accordingly, initially, premiums can be relatively low. However, as expected investment returns are not realized, the benefit promise needs to be backed up by higher premiums. Indeed, DB turns out to be a mixture of PAYG and DC in this case.¹²

Table II.2 Market scenario

	1990	2000	2025	2050	2075
in per cent gross wage					
<i>Contribution rates</i>					
PAYG	6.6	6.7	9.6	12.4	11.7
DC	3.2	3.3	3.5	3.8	3.8
DB	3.2	4.3	4.2	5.2	4.1
Total	13.0	14.3	17.3	21.4	19.6
<i>Pension levels</i>					
PAYG	16.9	17.0	17.3	17.0	17.0
DC	12.8	11.8	11.6	12.3	13.6
DB	12.8	12.8	13.2	13.7	13.9
Total	42.5	41.5	42.0	43.1	44.5

¹²Also when in the market scenario the expected nominal rate of return equals the realized return, DC and DB rates differ slightly, because DB rates adjust slowly to demographic changes.

Table II.3 Intergenerational Solidarity scenario

	1990	2000	2025	2050	2075
in per cent gross wage					
<i>Contribution rates</i>					
PAYG	4.9	5.0	7.1	9.2	8.6
DC	7.7	8.0	8.6	9.4	9.4
DB	5.9	9.1	9.3	11.1	9.6
Total	18.5	22.1	25.0	29.7	27.6
<i>Pension levels</i>					
PAYG	16.2	16.2	16.5	16.1	16.1
DC	12.9	12.3	12.7	11.8	13.2
DB	12.9	12.9	13.5	14.1	14.5
Total	42.0	41.4	42.7	42.0	43.8

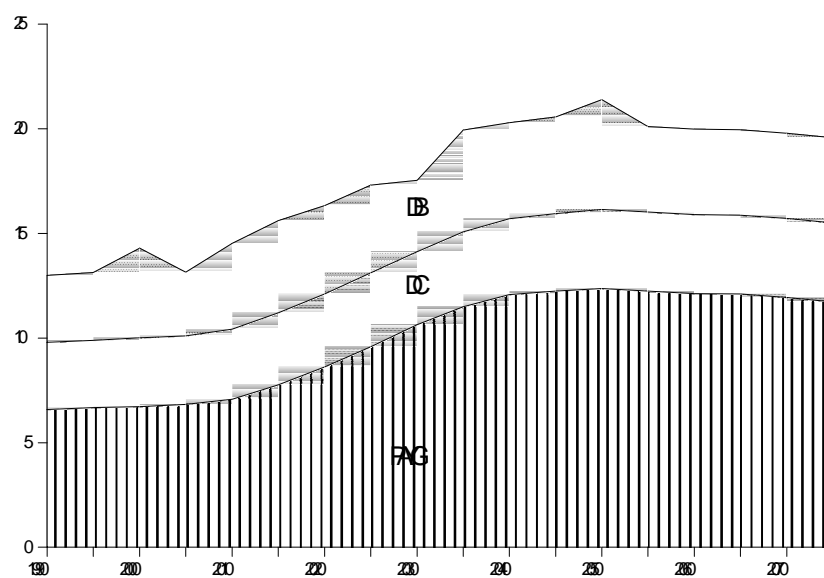
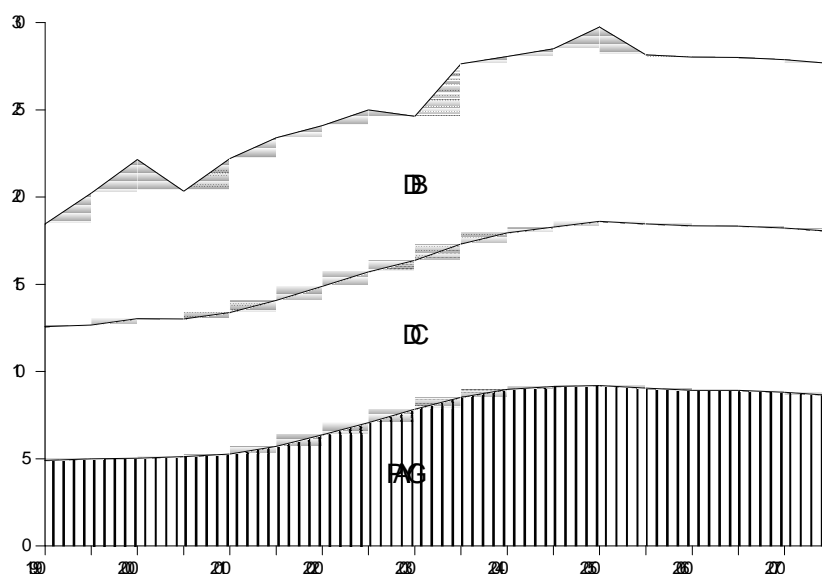
Figure II.1 Contribution rates in market scenario, in per cent of gross wage, 1990-2075

Figure II.2 Contribution rates in intergenerational solidarity scenario, in per cent of gross wage, 1990-2075



2. The scenarios in a broader perspective

This section elaborates on the scenarios by including various other trends and by allowing for endogenous developments in the mix of the various pension systems. The previous section distinguished the two scenarios on the basis of only the Aaron condition and the relative economic performance of the OECD versus the non-OECD region. We now extend the distinguishing features by considering *intragenerational* inequities and heterogeneity, technological developments, market structure, and various market imperfections. In the market scenario, markets are competitive and dynamic, capital and labor mobility are high, the population is heterogeneous, the income distribution within generations is less equal, and formal market relationships are dominant. In the intergenerational solidarity scenario, in contrast, implicit contracts, government intervention, and various non-market institutions play an important role in alleviating various imperfections in labor and capital markets. Indeed, markets are much less competitive. Whereas the *free-market* perspective is dominant in the market scenario,

the *coordination* perspective is important in the intergenerational solidarity scenario.¹³ The rest of this section discusses in more detail the features of the two scenarios, which are summarized in Box 5.

a. Market scenario

Globalization and international convergence

Globalization proceeds rapidly. Information technology allows capital to become much more mobile internationally, not only *within* but also *between* regional blocks. At the same time, outward-looking policies and good public governance enhance the investment climate in non-OECD countries. Also abundant labor resources and enhanced educational levels contribute to this improved climate. Growing inward direct investment allows non-OECD countries to benefit from knowledge spillovers. Indeed, knowledge is easily transmitted between people and firms. Internationally mobile factors (i.e. capital and knowledge) rather than relatively immobile factors (such as human capital) are the main motors behind economic growth. Hence, non-OECD countries feature high productivity growth as their productivity levels rapidly catch up with those in OECD countries. Excellent investment opportunities in non-OECD countries result in high interest rates on world capital markets.

Growth in OECD lags

Growth in OECD countries lags growth in non-OECD countries. The older labor forces in OECD countries have a hard time keeping up with rapid technological changes. Moreover, training and education of the young suffers as political tensions between generations cause the informal intergenerational contract between the old and the young to weaken. Also the high interest rate favors investment in financial capital over that in human capital. Moreover, taxes and transfers become increasingly distortionary as the trade-off between equity and efficiency worsens (see the sub-section on public policy below).

As their trade deficits grow after 2025, OECD countries specialize in non-tradable service sectors while many high-tech industrial sectors producing tradable goods move to non-OECD countries. The narrowing gap in living standards between the OECD and non-OECD countries mitigates migration flows. Indeed, the world exploits the diverging needs and endowments of OECD and non-OECD countries through capital and trade flows rather than labor flows.

¹³See CPB (1992) for a discussion of these various perspectives.

 Box 5 The main features of two scenarios

	Market	Intergenerational solidarity
<i>Growth performance of regions</i>		
OECD	–	+
non-OECD	+	–
<i>Returns on investment in OECD</i>		
return on capital	+	–
return on human capital	–	+
<i>Motors of economic growth</i>		
human capital	0	+
public infrastructure	0	+
private research and development	+	0
<i>International integration</i>		
capital mobility	+	0
labor mobility	0	+
trade between major trade blocks	+	–
international knowledge spillovers	+	0
<i>Macro-economic balances in OECD</i>		
current account balance	+	0
government balance	–	+
private saving-investment balance	+	–
<i>Technology</i>		
biased towards low-skilled labor	+	0
process innovation	0	+
product innovation	+	0
innovative start-up firms	+	0
innovation in large, mature firms	0	+
tacit knowledge	0	+
<i>Human-capital formation in OECD</i>		

The main features of two scenarios (continued)

	Market	Intergenerational solidarity
<i>Income distribution</i>		
relative wages of low-skilled workers	–	0
relative primary incomes of the elderly	+	–
cost of medical care for the elderly	0	+
<i>Convergence of incomes</i>		
international	+	–
intergenerational	+	–
intragenerational	–	0
<i>Labor market</i>		
labor-market imperfections	–	+
participation rate	–	+
effective retirement age	–	+
labor mobility across firms	+	–
<i>Capital market</i>		
capital-market imperfections	–	+
capital mobility across firms	+	–
international capital mobility	+	–
<i>Industrial structure</i>		
stakeholder view of the firm	–	+
firm-specific investments	–	+
turnover of firms	+	–
large firms dominant	–	+
dominant market structure	monopolistic competition	oligopoly
<i>Cultural trends</i>		

The main features of two scenarios (continued)

	Market	Intergenerational solidarity
<i>Politics</i>		
international cooperation	+	-
intergenerational contract	-	+
faith in government	-	+
faith in market forces	+	-
size of government	-	+
<i>Social security</i>		
spending level	-	+
tagging	-	+
less moral hazard	-	+
level of insurance	-	+
<i>Income support in old age</i>		
Poverty alleviation through PAYG scheme	-	+
Old-age insurance through PAYG scheme	-	+
Occupational schemes of the DB type	-	+
Personal DC schemes	+	-

Intragenerational inequity and heterogeneity

Intragenerational inequities widen in OECD countries as technological change is biased against low-skilled labor. At the same time, abundant supply of labor in non-OECD countries keeps wages of low-skilled labor at relatively low levels. Moreover, overall supply of low-skilled labor in OECD countries remains sizable because education and training in OECD countries fail to upgrade the skills of the lowskilled. Schooling of low-skilled workers suffers from budgetary problems and political tensions reducing funds for public education. Employers invest in their high-skilled workers rather than in flexible, low-skilled workers. All these trends increase wage disparities.

The weak labor-market position of the low-skilled reduces the overall participation rate. Many of these workers retire early, draw on social security, and participate in the black and informal economies. High-skilled workers, in contrast, retire later. Indeed, the productivity of these workers continues to grow as the educational level rises. The elderly with high incomes benefit from high returns on their saving. Moreover, their medical expenses do not rise much as low wages reduce the costs of medical services. Furthermore, the elderly generally remain in good health for most of their retired lives.

Thus, while convergence between the OECD and the non-OECD countries reduces international inequities and high interest rates alleviate intergenerational inequities, intragenerational inequities within the OECD countries grow.

Market structures

In addition to incomes, lifestyles and workpatterns become more heterogeneous. Individualisation is a major trend. Product differentiation becomes more important as tastes of consumers become more heterogeneous. Accordingly, monopolistic competition becomes a dominant market structure. Start-up firms play a major role in product-innovation. Indeed, firms turn over rapidly.

As far as human capital is concerned, general skills are more important than firm-specific skills. Moreover, job mobility is high and the labor market is rather competitive. The same holds true for the capital market as the shareholder view of the firm dominates the stakeholder-view (see Gelauff and Den Broeder (1996)). Indeed, efficient financial markets rapidly reallocate capital from old declining firms to innovate start-up firms.

Public policy

Intergenerational solidarity through collective PAYG schemes comes under pressure. The old are becoming a heterogeneous group featuring both high and low incomes. Hence, age is no longer a good indicator for poverty. Indeed, OECD countries feature both young workers with low (labor) incomes and elderly who collect high (capital) incomes.

With age not being a good indicator for poverty, tax privileges for the elderly are withdrawn. PAYG pensions substantially lag the standard of living of the young and are eventually integrated with poverty alleviation in general. To avoid a serious poverty trap, the government is not able to guarantee a high minimum income level. Indeed, taxes and transfers become increasingly distortionary because of two reasons. First, conditioning transfers on income is rather distortionary because flexible working pattern yield elastic labor supply. Second, heterogenous life styles imply that the government cannot use "tagging" as a means to identify needy groups but has to rely on income as an indicator for poverty. Indeed, the government reduces income differentials and provides insurance against low incomes more through the tax system (i.e. a negative

income tax) and means-tested benefits and less through social insurance benefits conditional on non-income information (e.g., age, married status, unemployment, disability). To prevent agents from exploiting means-tested benefits during retirement and to compensate for the withdrawal of tax privileges for pension saving, the government makes some private pension saving compulsory. This stimulates saving but reduces labor supply.

The heterogeneous population in combination with the trend towards individualisation causes the informal intergenerational contract between the generations to weaken. Fiscal imbalances originating in high interest rates, distortionary taxes, the low participation rate and the relatively low growth rate reinforce this trend. Consequently, the young receive less public education while the old collect less public transfers.

Also occupational DB schemes become less important. These schemes are less appropriate for a flexible workforce with diverse needs. Moreover, in a rather competitive environment, firms can not sustain intergenerational solidarity among workers and can no longer commit to age-related pay schemes.

DC schemes become more popular. These individual schemes better fit the diverse needs of the heterogeneous and flexible labor force. Moreover, funded schemes benefit from risk sharing in efficient financial markets, high interest rates, and good investment opportunities in the non-OECD countries. Indeed, through their investments, the elderly in the OECD become stakeholders in the economies of the non-OECD countries.

b. Intergenerational solidarity scenario

Regionalisation and divergence

In this scenario, internationalization occurs within trading blocks. International political tensions and imperfections in capital markets due to asymmetric information inhibit sizable capital and trade flows between the main trading blocks. Hence, international capital and goods markets cannot take full advantage of differential demographic phases in OECD and non-OECD countries by moving capital towards the non-OECD countries. Moreover, small inward capital flows imply that non-OECD countries do not benefit from large knowledge spillovers. Growth in these countries suffers also from inward-looking policies and inadequate education and public infrastructure. Human capital, which is not very mobile internationally, is the main motor of growth. Indeed, knowledge is not very mobile internationally but rather is embodied in immobile people and rather immobile firms. Accordingly, productivity levels in non-OECD countries fail to catch up with those in OECD countries. Limited investment opportunities in the non-OECD countries and scarce labor in the OECD keep interest rates in OECD countries at rather low levels.

High OECD growth

Productivity growth in the OECD is rather high. Almost all domestic saving is invested in the OECD. Scarce labor stimulates technologies that enhance the productivity of both high-skilled and low-skilled labor (see e.g. Cutler e.a. (1990)). Productivity levels benefit also from the older, experienced labor force. Moreover, public education raises the educational level of the young further as the implicit intergenerational contract remains strong. Rapid wage growth reflects the key role of human capital in the growth process. Also this wage growth together with low interest rates stimulates investment in human capital, rather than that in financial capital. OECD countries specialize in knowledge-intensive high-tech sectors. The social security system does not impose high economic costs as an homogeneous population allows for 'tagging'.

Various developments offset the trend toward lower labor supply in OECD countries due to aging. High wages stimulate labor-market participation rate of women and the elderly. Moreover, the large gap in living standards between the OECD and non-OECD countries encourages some selective and controlled inward migration into the OECD. Indeed, labor flows rather than capital and goods flows exploit the diverging demographic developments in various parts of the world.

Intragenerational inequities and heterogeneity

Intragenerational inequities in OECD countries are contained. Wages of low-skilled workers are upheld by the scarcity for labor and the abundance of capital. Public education and on-the-job training succeed in upgrading the skills of many low skilled, thereby increasing the wages of the remaining low-skilled workers. The stronger labor-market position of low-skilled workers protects their participation rate and raises their effective retirement age.

The elderly remain a rather homogeneous group featuring relatively low incomes. The elderly generations suffer from low rates of return on their saving. Moreover, medical expenditures are high as elderly suffer from poor health. At the same time, high wage growth raises the price of (medical) services provided to the elderly.

Thus, in contrast to the previous scenario, international and intergenerational inequities are maintained. Intragenerational inequities, however, do not widen.

Market structures

Lifestyles and workpatterns do not become much more heterogeneous. Individualisation is a less dominant trend. Product differentiation is less important. Accordingly, R&D focuses more on process innovation than on product innovation. Most technological advances occur in large established firms that internalize knowledge spillovers rather than in start-up firms. Firms turn over slowly. Retained earnings are the main source of investment financing. Oligopolistic market structures become more dominant.

Human capital is rather firm-specific. Labor and capital mobility between firms is less important as adjustments occur *within* rather than *across* firms. Labor and capital markets are not very competitive while corporatist institutions help to alleviate labor market imperfections. Informal contracts play an important role in encouraging firm-specific investments and binding workers to firms. The stakeholder view of the firm becomes dominant.

Public policy

Intergenerational solidarity through collective PAYG schemes is maintained. Age remains a good indicator for poverty. More generally, the informal intergenerational contract between the generations remains intact. The high participation rates of old and young workers and the low interest rates create the budgetary room to provide both a good education to the young and sizable PAYG transfers to the old. Moreover, the elderly can enforce the intergenerational contract because their sheer number and their homogeneity makes them strong politically. Indeed, the informal intergenerational contract makes the elderly stakeholders in the high-yielding human capital of the young in their own countries. In the market scenario, in contrast, formal contracts cause the elderly to become stakeholders in non-OECD countries.

The economic cost associated with transferring incomes from the young to the elderly is rather low. First, the government can condition transfers on age rather than income. Second, marginal tax rates are not so distortionary because labor supply is rather inelastic.

DC schemes suffer from low returns and high transaction costs. The tastes of the population remain rather homogeneous. Accordingly, collective DB schemes remain popular as an instrument for intergenerational risksharing. Moreover, employers use these pension schemes as a means to motivate workers and tie workers to the firm.

III. POLICIES TO INSURE AGAINST AGING

As the scenarios illustrate, the future is fundamentally uncertain, especially over a long time horizon. To diversify risks, policymakers in OECD countries should take action on several fronts. In particular, they can address the prospective aging in two main ways. First, by encouraging investments in human capital of the young (section III.1.a) and the elderly (section III.1.b). Second, by stimulating investments in physical and intangible capital in OECD (section III.2.a) and non-OECD countries (section III.2.b). Investing in human capital works best in the intergenerational solidarity scenario and is in fact underlying high OECD growth in this scenario. Investing non-human in capital is a more appropriate course for the market scenario. Within each of these main lines of attack, a package of policy instruments has to be designed. Indeed, the challenge is to find a proper

blend of instruments for each specific country. Box 6 summarizes the various policy measures suggested in this chapter.

The use of several instruments is attractive not only from the point of view of risksharing but also for political reasons: costs and benefits are spread over various groups. Moreover, by using both carrots and sticks, policymakers prevent specific groups from being alienated and ensure that various groups become stakeholders in the reform process.

Box 6 Policies to insure against aging

INVESTING IN HUMAN CAPITAL

human capital in general

alleviating moral hazard in social security

- tighten requirements for disability and unemployment;
- enhance efficiency of social security administration;
- reduce social security benefits;

reducing marginal tax wedge on labor income

- strengthen link between contributions and benefits by reforming PAYG and DB pension schemes or by moving to multi-pillar systems with a larger role for DC schemes
- reduce perverse redistribution in pension schemes
- shift tax burden to those outside the labor force (e.g., by shifting to consumption taxes)
- maintain cash-flow income tax treatment of pension saving
- broaden the tax base by reducing tax privileges for the more affluent elderly
- mitigate tax arbitrage through a more neutral system of capital income taxation

human capital of the elderly

raising effective retirement age

- make pensions more actuarially fair;
 - encourage education permanente;
 - reconsider age-related pay schemes and final-pay pension schemes;
 - deregulate labor markets and sheltered sectors
 - alleviate moral hazard in social security
-

Box 6 Continued

human capital of the young

raising participation rate of women

- enhance child care
- reduce disincentives to work originating in the tax system

increasing human capital accumulation

- protect public spending on education
- facilitate implicit contracts in firms

INVESTING IN PHYSICAL CAPITAL

public saving

- cut budget deficit

private saving

- provide tax incentives
- (gradually) reduce the relative importance of PAYG benefits
- make pension saving compulsory
- issue indexed government bonds

investment inside the OECD

- develop stock markets
- improve corporate governance
- enhance competition
- pursue stable macroeconomic policies

investment outside the OECD

- enhance efficiency of financial sectors in non-OECD
 - improve accounting standards
 - promote trade liberalization
-

For example, the age at which public retirement benefits are paid may be raised. However, without supplementary policies strengthening the labor-market position of the old, such a policy would risk alleviating the elderly generation. Spreading the various policy measures over time and gradually phasing in new policies are other ways to reduce political resistance. Indeed, taking and announcing policy measures early, avoids abrupt and therefore painful policy corrections.

1. Investing in human capital

To prepare against aging, society can invest in human capital of either the elderly or the young. Investing in the elderly reduces the need for intergenerational transfers. Investing in the young, in contrast, increases this need so that the elderly can share in the fruits of the investments in the young.

a. Human capital of the elderly

Recent trends

Over the last two decades, the effective retirement age has dropped substantially in the OECD countries (see Tables III.1 and III.2). Pension systems and various special early retirement schemes contributed to this trend. Moreover, generous benefits in combination with lax enforcement in other conditional social security programs, such as unemployment and disability schemes, facilitated the early withdrawal from the labor market of older workers, especially of low-skilled workers. In Europe, policy measures encouraged older workers to leave the labor market in order to alleviate the adverse social effects of industrial restructuring and preserve employment opportunities for younger workers. Indeed, the drop in the effective retirement age has been particularly pronounced in Europe. The actual retirement age, computed from more detailed age-specific activity rates, declined from 64.3 in 1950 to 61.8 in 1980 (see Table III.2). This drop of 2.5 years compares with a drop of 1.5 years in the corresponding period in the United States and only 0.7 year in Japan. The participation rate for those aged between 60 and 64 years in Europe is only 25%, compared to 45% and 55% in the United States and Japan, respectively (see Table III.1).

Need for reform

Over the past two decades, several policies have encouraged elderly workers to reduce their labor supply in order to alleviate unemployment. However, early retirement is rather ineffective in reducing unemployment, which should be addressed in other ways. By reducing the supply of experienced labor, early retirement is an increasingly costly and shortsighted

way to address unemployment. In fact, maintaining adequate levels of social security in the face of an aging population requires labor supply to rise rather

Table III.1 Participation rates and effective retirement age in the EC, Japan and the US, 1990

	Participation rates					Retirement age	
	50-54	55-59	60-64	65-69	70-74	Effective	Statutory
Belgium	54.0	34.2	12.1	1.9	0.4	59.5	65/60
Denmark	84.1	72.7	37.5	16.4	2.3	62.6	67
France	74.8	51.6	16.3	4.5	1.4	59.9	60
Germany	73.2	58.7	21.4	4.6	1.7	60.8	65
Greece	61.9	50.8	33.1	14.6	4.1	63.1	65/60
Ireland	57.4	49.3	35.2	15.4	6.8	63.9	66
Italy	59.0	42.0	21.1	7.8	1.6	61.1	65
Luxembourg	57.4	35.4	13.2	0.0	0.0	59.2	65
Netherlands	61.3	46.3	17.1	6.4	2.3	60.8	65
Portugal	66.0	54.8	37.7	23.3	8.1	64.0	65/62
Spain	57.5	48.8	31.0	6.5	1.1	62.5	65
United Kingdom	79.0	67.0	38.0	10.7	3.3	62.4	65/60
Austria	73.1	53.3	15.1	2.6	2.1	59.9	65/60
Finland	77.9	58.3	28.6	3.4	2.8	60.9	65
Sweden	92.6	82.8	56.4	9.8	3.1	63.1	65
EC	69.5	53.8	25.5	7.3	2.3	61.3	65
Japan	82.0	71.5	54.7	24.4	23.9	64.8	60/55
United States	80.0	66.1	44.2	11.5	6.3	62.8	65

Source: CPB, OM108 (1993)

than to fall so that the contribution base is maintained. This should be communicated clearly so that the expectations of workers are realistic.

Indexing the retirement age to life expectancy is the most natural way to insure society against a longer average life of its citizens so that people spend part of their longer life in work and part in retirement. In the view of the World Bank, "raising the retirement

age – regularly as longevity increases – is probably the single most important reform to improve the financial prospects of the public pension plan".¹⁴

A higher retirement age implies that the human capital embodied in the elderly is used more intensively. This raises the return on effort and schooling, thereby facilitating life-long training ('education permanente'). By redistributing human capital more equally over various generations, a higher retirement age attacks the potential fiscal and social problems due to aging at the root. The elderly rely less on the solidarity of the young and more on their own human capital. Indeed, by keeping older workers longer employed, governments reap a double dividend. The elderly not only reduce social spending but also broaden the contribution base.

Table III.2 Participation rate, effective retirement age and life expectancy, 1950-1980

	Participation rate age group 55-64		Effective retirement age		Life expectancy at birth	
	1950	1980	1950	1980	1950	1980
Belgium	46.0	38.3	63.8	61.2	67.5	73.7
Denmark	59.6	58.5	64.2	62.7	71.0	74.5
France	57.7	45.7	64.4	61.0	66.5	74.7
Germany	49.8	43.1	63.7	61.0	67.5	73.9
Greece	48.9	43.3	65.2	63.1	65.9	74.7
Ireland	55.4	50.2	65.8	64.1	66.9	73.1
Italy	45.5	31.7	63.9	60.3	66.0	74.6
Luxembourg	50.0	28.6	64.4	59.9	65.9	73.3
Netherlands	50.9	40.9	64.6	62.2	72.1	76.0
Portugal	47.3	44.7	65.4	63.1	59.3	72.2
Spain	49.2	41.2	65.5	62.9	63.9	75.8
United Kingdom	53.9	61.9	64.4	62.8	69.2	74.0
EC average	51.3	45.1	64.3	61.8	67.0	74.4
Japan	63.0	64.5	64.7	64.0	63.9	76.9
United States	57.2	55.8	64.4	63.0	69.0	74.5

Sources: ILO (1986); United Nations (1989); own calculations.

¹⁴ World Bank (1994), pp 147.

Raising the effective retirement age requires a stronger labor-market position of elderly workers. Employers can be encouraged to employ elderly workers not only by increasing the skills of the elderly but also by reducing wage costs. To achieve this, age-related pay schemes may have to be reconsidered so that wages can be better adjusted to individual productivity levels. More generally, wages of elderly workers may have to decline relative to wages of younger workers, especially when younger workers become relatively scarce. This may require not only deregulation of the labor market but also modification of social security schemes. For example, occupational pension systems that link pension benefits to final pay discourage gradual retirement through occupational downgrading with lower rates of pay.

Gradual retirement

A gradual transition from work to retirement can keep many older people employed longer. Indeed, many elderly seem to prefer gradual retirement (see OECD (1995)). Moreover, labor-market policy for elderly workers may have to become more 'active' by helping the elderly to remain in employment and upgrade their skills. To further facilitate gradual retirement, social security schemes may have to be modified.

The growth of self-employment and part-time work in several OECD countries may help retirement to become a less abrupt process. Both self-employment and part-time work may be stimulated by deregulating not only the labor market but also sheltered sectors, especially those sectors that experience little technological change but can employ experienced older workers. To illustrate, sectors providing services to and caring for the very old seem to offer considerable scope for employing low-skilled elderly who want to retire part-time. The same holds true for childcare as women with children participate more in the labor market. When labor becomes increasingly scarce and needs for these non-tradable services grow, elderly men and women face increasing incentives to keep supplying labor longer, provided that markets for labor, goods and services are allowed to function efficiently.

Efficient retirement decisions

Different people may want to leave the labor force at different times and in different ways. To facilitate efficient decision making by workers with diverse needs and preferences, pension systems should confront potential retirees and their employers with the social costs of retirement. In other words, early and late retirement benefits should be actuarially fair. Accordingly, also as far as the retirement decisions are concerned, individual benefits and costs should be closely linked.

Various routes for withdrawing from the labor force are substitutes. Accordingly, in confronting workers with the social costs of their labor-supply decisions, governments should pursue a comprehensive approach. Various conditional social security benefits,

such as unemployment and disability benefits, are subject to moral hazard. As the work force ages, these moral hazard problems become more serious as older workers are subject to higher disability and unemployment risk.

Reforming social security

The CPB study "Scanning the Future" distinguishes two possible directions for social-security reform aimed at reducing moral hazard.¹⁵ The first direction aims at preserving the European legacy of social equity as much as possible by reducing improper use of social insurance. This can be done by tightening the requirements for social benefits (e.g., stricter evaluations of disability, making unemployment benefits conditional on retraining or accepting less desirable jobs), tightening checks on improper use of social benefits, and enhancing the efficiency of the organizations administering social benefits. However, privacy arguments may be a stumbling block to avoiding moral hazard. Moreover, an increasingly heterogeneous society with flexible and diverse lifestyles complicates this strategy.

The second strategy focuses on reducing the level of insurance. It simplifies social security and widens the income gap between working and non-working. At the extreme, a negative income tax could replace social security altogether. In this way, the government would give up social insurance for events such as unemployment, disability, and age. Indeed, the government would use only income information in redistributing resources.

The first and second strategies are associated with, respectively, the intergenerational solidarity and market scenarios. In practice, both strategies may be combined, in part to diversify risks. Moreover, the second strategy aids the first: Lower benefits help to prevent improper use of social security. Furthermore, within the first strategy of making social security more efficient, market-oriented reforms can play a useful role. The government, while prescribing the level of insurance, may leave the administration of the insurance to the private sector.

A lower marginal tax wedge

As workers become more flexible in selecting how and when to retire and, more generally, supply labor to the formal and informal sectors, lowering the marginal tax wedge becomes a more important instrument to ensure efficient decisions on labor supply. Indeed, the strong link between individual contributions and benefits in DC schemes facilitates more efficient retirement decisions. However, the scope to raise actuarial fairness and reduce marginal tax rates is reduced by the desire to redistribute resources within generations (i.e. protect the needy and alleviate poverty) and across

¹⁵ See CPB (1992).

generations (intergenerational risksharing). To improve the trade-off between efficiency, redistribution and risksharing, governments should ensure that redistribution is transparent. Moreover, redistributive transfers should be targeted at those in need. Hence, perverse redistribution should be eliminated if it does not enhance incentives.

One way to tighten the link between benefits and contributions without harming equity is to separate pension schemes in a part focusing on poverty alleviation and a part dealing with old-age insurance (see World Bank (1994)). Such a reform may prevent aging from raising payroll taxes, which tend to bear relatively heavily on low-skilled workers with an increasingly weak labor-market position.

The public scheme dealing with poverty alleviation is explicitly redistributive and should be financed not by payroll taxes but by other taxes, such as progressive income taxes and commodity taxes on consumption. Replacing payroll taxes by consumption taxes (such as VAT) alleviates the tax burden on workers by shifting this burden in part to those outside the labor force, including the retired. Progressive income taxes move the tax burden from workers with low incomes to those with higher incomes and, if pensions are taxed on a cash-flow basis (see section IV), to retirees with high incomes. The heavier tax burden on higher incomes may raise the marginal tax rate. However, by more closely linking pension premiums and benefits in the insurance part of the pension system, the government may be able to reduce the overall marginal tax rate.

Shifting from PAYG schemes with a weak link between contributions and benefits to DC schemes with a strong link creates a transition problem as current workers have to pay for two pensions, i.e. for that of the currently retired and that of themselves. The temporarily high premium may raise wage costs and reduce employment. However, the government may use debt policy in such a way that the premiums are smoothed over time and all generations benefit from the efficiency gains produced by lower labor-market distortions (see Raffelhüschen (1993), Kotlikoff (1995) and Broer e.a. (1994)). In particular, by financing part of the reform by issuing public debt, future generations, who reap the efficiency gains associated with a better functioning labor market, pay part of the costs of the reform.

Cash-flow treatment of pension saving under the income tax

Most OECD countries treat pensions on a cash-flow basis under the personal income tax (see Dilnot and Johnson (1993)). Hence, pension premiums are tax deductible, while pension benefits are subject to the income tax. This implies that the government delays the collection of the income tax until retirement. In this way, the government, in effect, participates in the pension funds. The return on this public investment amounts to the taxes the government eventually collects on the retirement benefits. If the tax rate against which contributions are deducted coincides with the rate at which benefits are

ultimately taxed, the return on this implicit equity share of the government corresponds to the return pension funds collect on their investments.¹⁶

The cash-flow treatment yields a number of important advantages. In particular, the cash-flow treatment broadens the tax base when aging boosts public spending. If the government would abolish the cash-flow treatment of pensions by taxing pension premiums, it could alleviate future fiscal imbalances by cutting public debt now. However, such a reduction of public debt would require a lot of fiscal discipline.

In a 'grey' society with mature pension funds, the broader tax base under the cash-flow tax implies that unexpected shocks in public spending require smaller adjustments in tax rates as income taxes are levied not only on workers but also on the retired. When higher age-related public spending requires higher public revenues, the cash-flow treatment mitigates the associated rise in tax rates on workers and thus alleviates the adverse effects of the higher tax burden on labor-supply incentives.

The cash-flow tax on pensions also limits the opportunities for international tax arbitrage.¹⁷ Without tax deferral, individuals would pay income taxes mainly when they participate in the labor force. After retirement, in contrast, they would not pay much income tax. However, the benefits they enjoy from public spending are likely to rise rather than fall when individuals grow older. Mobile individuals could exploit the time lag between paying taxes and benefiting from public services. Retirees, for example, might migrate to countries with high-quality public services after having spent their working lives in a country with a relatively low tax burden corresponding to low-quality public services. By moving to the high-tax country only after retirement, they would escape most of the heavy tax burden that is required to finance the public services they will benefit from.

By bringing the payment of taxes and the enjoyment of public services closer together in time, the cash-flow treatment of pensions may also help to sustain political support for those categories of public spending that primarily benefit the elderly. The reason is that, by paying income tax on their pension benefits, the elderly contribute in a direct and transparent way to the public spending they benefit from.

Two other advantages of the cash-flow treatment involve intragenerational equity. First, tax deferral allows individuals with relatively high incomes at the beginning of their life

¹⁶ See Bovenberg and Petersen (1992).

¹⁷ However, despite the cash-flow treatment, some possibilities for international tax arbitrage remain. To illustrate, immediately after retiring from the labor force, individuals may want to reside in a country with relatively low tax rates corresponding to low-quality public services. When health starts to fail, they may move to a high-tax country providing better public services to the elderly.

cycle to spread their taxable income more evenly over their lifetimes. The resulting reduction of the burden of the progressive income tax is desirable if lifetime income is considered the proper measure for ability to pay.

The other reason why tax deferral contributes to intragenerational equity involves the redistributive elements in DB pension plans. In view of the weak link between individual contributions and benefits, individuals generally do not perceive pension premiums as being part of their disposable income (and hence their ability to pay). Instead, they look upon their pension contributions as a kind of tax. Accordingly, subjecting pension premiums to income tax, as a proxy for the accumulation of individual pension rights, would be perceived as a form of double taxation and thus viewed as inequitable.

The cash-flow treatment contributes also to an equitable income distribution between generations. In particular, under tax deferral, the government can employ the income tax rate on pension benefits as an instrument to alter the intergenerational distribution of income. Alternatively, it could employ indirect (consumption) taxes, such as the value-added tax or excises, to change the tax burden on the elderly. Compared to the progressive income tax, however, these latter tax instruments put a relatively heavy burden on those elderly with low incomes. By including retirement benefits in the income tax base, tax deferral provides the government with an additional instrument to ensure an equitable distribution *between* generations without adversely affecting the distribution *within* generations.

By participating in the pension funds, the government shares in the investment risk. The government can alleviate the investment risk further by letting the tax rate on the investment income of pension funds rise with the average return. If the average return is low, the government can transfer resources to the pension funds. Since the tax rate depends on the average return of all pension funds rather than the individual return of each pension fund, this tax treatment does not remove the incentive to invest in high-yielding assets.

This tax treatment yields a number of advantages. The government, in fact, insures the pension funds against long-run investment and inflation risks that these funds cannot hedge against on financial markets. Consequently, the risk premium in pension contributions can fall, thereby lowering wage costs and improving international competitiveness. Moreover, DC schemes become more attractive. By reducing the marginal tax wedge on labor, this improves the functioning of the labor market. Furthermore, since pension funds no longer need to transfer resources across generations, workers can be left free to select their own pension plans. This allows more competition among pension funds, which may reduce overall costs of pension provisions. Moreover, it allows pension provisions to better fit the diverse needs of a heterogeneous population.

As an alternative to this tax system, the government may bear only part of the macro-economic risk, for example, by issuing indexed bonds. In this way, pension funds are protected against inflation risk but still bear real interest-rate risk. By issuing longer maturities, however, the government can absorb part of this risk, as well.

b. Human capital of the young

Increasing labor-market participation

One way to help sustain intergenerational solidarity in an aging society is to increase the participation rate of the young in the formal sector. This creates a stronger base for financing retirement benefits. Increasing the rewards to work by tightening social security benefits and reducing the tax wedge (see section III.1.a above) may stimulate labor supply of not only older but also younger workers. Reforming social security yields a double dividend: not only does the tax base widen but also public transfers to the young decline.

Following the drop in fertility, many women have moved from the informal into the formal sector. However, in many OECD countries, there is still considerable scope for women to increase their labor supply. When labor becomes increasingly scarce, women will face stronger financial incentives to increase their labor-market participation, provided the tax system does not dull these incentives. Improved child care, which can be provided by elderly workers, may also enhance labor-market participation of young women with young children. This trend toward a higher female participation rate strengthens the labor skills and human capital of women. This allows them to rely less on public transfers when old -- an added benefit from the point of view of reducing the claim of old-age pensions on the budget.

More human capital

Helping the young to accumulate more human capital is another way to strengthen the contribution base for PAYG and DB schemes. However, raising productivity growth may actually worsen the financial problems of pension systems if pension benefits are indexed to wages. Indeed, if the elderly fully share in the productivity gains, increased labor productivity raises pension costs. Accordingly, raising productivity growth by investing in the human capital of the young makes PAYG and DB schemes more sustainable only if pensions are not indexed to wages so that retirees do not fully share

in productivity growth. Hence, while elderly feature a higher standard of living in absolute value, their relative income position worsens.¹⁸

A more rapid rate of human capital accumulation can be accomplished through implicit contracts. As part of an implicit intergenerational contract, the young may receive public education financed by the elderly. Implicit contracts between the firm and the worker involving a rising wage schedule (which may be implicit in DB pension schemes) may facilitate investments in firm-specific human capital by mitigating the hold-up problem associated with investments in firm-specific human capital.

Also market incentives affect the accumulation of human capital. A lower marginal tax rate may raise the wage differential between low- and high-skilled jobs, thereby encouraging workers to accumulate more skills. Another market incentive for human capital accumulation is a higher expected rate of wage growth.

c. Numerical illustration

Table III.3 illustrates how increased labor supply can contain the rise in the retiree/worker due to aging. The present average retirement age in the OECD is 62 years. The younger age brackets feature a participation rate of 72.4. These figures imply a worker/retiree ratio of about 3.0. If the retirement age and the participation rate would remain at present levels, demographic developments would cause the worker/retiree ratio to drop to 1.5 in the course of the next 50 years (see the first column of Table III.3). As a direct consequence of this cut in half, the PAYG contribution rate would have to double to keep the replacement rate (i.e. the pension level as a percentage of wages) at a constant level. However, if the actual retirement age would rise by 1 year each decade and the participation rate in the younger age brackets would gradually rise to 85 percent, the worker/retiree ratio would change much less (see the diagonal in Table III.3). Accomplishing such an increase in overall labor supply would require fundamental reforms discussed in chapter III, including alleviating disincentives to work by tightening social security benefits, reducing the tax wedge, and making pensions more actuarially fair.

¹⁸ Since the elderly care both about their absolute and relative living standard, pensions may be indexed to a mix of prices and wages.

Table III.3 Ratio of number of employed to the number of retired in the OECD under alternative assumptions

Average Retirement Age ^a	62	63	64	65	66	67	68
Activity rate ^b	72.4	75.1	77.5	79.7	81.7	83.4	85.0
1990	3.01						
2000	2.78	3.10					
2010	2.47	2.79	3.13				
2020	2.03	2.28	2.55	2.84			
2030	1.66	1.86	2.07	2.31	2.57		
2040	1.51	1.67	1.85	2.03	2.24	2.47	
2050	1.48	1.64	1.80	1.98	2.18	2.39	2.62

^a Activity rates for those aged 55 and over, such that they retire on average at the specified age.

^b Average activity rate for the population aged 15-54.

2. Investing in non-human capital

To reduce the risk of aging, countries can shift resources intertemporally by saving more, either through the public or private sector. These savings can be invested either at home or abroad.

Public saving

Public sectors providing extensive public pension schemes or other sizable benefits to the elderly could raise public saving (or reduce government dissaving) in order to prepare for aging. This yields several advantages. First, intertemporal tax smoothing may enhance efficiency. If governments expect tax rates to rise or otherwise become more distortionary over time, they may want to raise tax rates now rather than later. The benefits of such a strategy in terms of lower future tax rates are substantial if interest rates are expected to be high.

Increasing public saving may benefit also intergenerational equity if future generations are expected to be harmed by poor growth or worsening environmental conditions. Moreover, increasing public saving through a trust fund provides a clear signal that the babyboom generation is willing to contribute to its own retirement. This may help to sustain the intergenerational contract between generations when the babyboom generation retires.

Raising public saving also implies some risks. First, lower public debt (or higher pension reserves) may tempt governments to spend more, thereby raising the overall tax level.¹⁹ In any case higher public saving is likely to require higher current tax rates, thereby discouraging labor supply in the short run. The pay-off in terms of lower future tax rates and higher welfare of future generations may be quite low if the interest rate turns out to be low compared to the growth rate. By making labor scarcer relative to capital, the return on financial capital may well fall below that on human capital. Moreover, if growth rates are high, future generations will be better off than the babyboom generation. This weakens the case for raising public saving on the grounds of intergenerational equity (see Cutler e.a. (1990)). Indeed, raising public saving seems more appropriate in the market scenario (with high interest rates, low growth, and highly distorting future taxes) than in the intergenerational solidarity scenario (see section II).

Private saving

Governments can stimulate private saving through various channels. By an early announcement of a gradual reduction in the relative importance of PAYG benefits, they may stimulate private funded schemes.²⁰ Furthermore, to prevent private agents from exploiting means-tested benefits to the elderly, governments may want to make some pension saving mandatory – especially if the public scheme focuses on poverty alleviation (see also section I.6). Private pension saving can be enhanced also by making collective bargaining agreements on occupational pension schemes compulsory. However, compulsory schemes may reduce labor supply by distorting the labor market. In particular, forcing low-skilled workers to save may raise wage costs, thereby further weakening the labor market position of these workers.

Regulations on funding requirements and portfolio management need to walk a fine line between under- and overregulating funded pension funds. Strict regulations inhibit financial innovation and prevent pension funds from fully exploiting the benefits of

¹⁹ Moreover, pension reserves could be diverted to low-yielding government projects. To avoid this danger, funds can be managed by an independent body shielded from political influence.

²⁰ For example, governments may link PAYG benefits to prices rather than wages, thereby gradually reducing the replacement rate. It may also announce a gradual increase in the retirement age. Another option is to focus the PAYG scheme more on poverty alleviation by reducing benefits to those earning higher incomes. This encourages high-income earners to save more. To spread the costs of such a transition over various generations, the government may finance part of its existing PAYG obligations through public debt issue (see section III.1.a). In that case, lower public saving offsets some of impact of more private saving on national saving. The gradual reduction in the replacement rate in the public PAYG scheme implies that elderly without additional pension incomes are likely to fall below the poverty line. This boosts public spending on means-tested benefits aimed at poverty alleviation (see also public policy in the market scenario, section II.2).

diversification. Lax regulations may allow pension funds to exploit the ignorance of workers who lack the expertise to assess investment policies. Full disclosure of information to workers reduces the need for regulation, especially when workers gain more financial experience and sophistication.

Regulations may be needed also to prevent economics of scale and scope (which lower marketing and transaction costs) from resulting in anti-competitive behaviour. Independent professional advisers to assist workers and retirees in evaluating various DC plans help to encourage healthy competition.

Table III.4 Contribution rate with comprehensive package

	1990	2000	2025	2050	2075
in per cent of gross wage					
Without reform	17.7	18.0	25.6	32.7	31.1
With reform	17.7	21.2	20.0	21.3	19.1
Difference	0	3.2	-5.6	-11.4	-12.0

Table III.4 shows how a funded system could be introduced in a country that presently relies only on PAYG pensions. As from 1995, all employees start paying 4% of their gross wage in a DC scheme. These schemes will mature gradually, thereby allowing for a gradual decline in the PAYG replacement ratio. In particular, PAYG benefits at retirement are not fully indexed to wages but rather lag these wages by 1 percentage point per year from 1995 until 2030. Moreover, the statutory retirement age will gradually increase to 67 years. These numbers imply that the reduction in PAYG benefits slightly exceeds the phased-in benefits from the DC scheme. Initially, contribution rates are somewhat higher. The additional savings prevent the contribution rates from rising rapidly. In fact, starting in 2010, the overall contribution rate is lower than in the benchmark scenario.

Fiscal privileges for pension saving

Most OECD countries grant tax preferences to pension saving. These privileges do not originate in the deductibility of pension premiums as such but rather in two other aspects of the tax treatment of pension saving. First, the marginal tax rates at which pension contributions can be deducted typically exceed the marginal rates applied to the benefits during retirement. The gap between these rates is due in part to rising marginal rates in

the income tax because taxable income during retirement tends to be lower than that when participating in the labor force. More importantly, many countries tax the elderly at concessionary rates or grant other special tax privileges to the elderly. In some countries, for example, pension benefits are not liable to social security taxes.

The second reason most tax systems favour pension saving is that no income tax is levied on the investment income of pension funds. Accordingly, the increase in the value of pension rights that corresponds to this capital income escapes the income tax, although it should be included in taxable income according to the Haig-Simons concept of taxable income. Indeed, the return on other types of saving is, at least in principle, subject to income tax.²¹

The tax privileges for pension saving have been supported by several arguments. In particular, tax advantages encourage individuals to provide for sufficient retirement incomes, thereby reducing the use of means-tested benefits during retirement. Furthermore, they may correct the short horizon of young workers.

However, fiscal privileges for pension saving suffer from a number of disadvantages. In particular, the tax advantages benefit mostly high-income earners, although the arguments supporting them apply primarily to low-income earners. Indeed, the additional wealth accumulated by high-income earners may encourage the workers to retire early, thereby harming the public finances.

The non-neutral treatment of various types of saving distorts also the allocation of saving towards institutional saving. Moreover, it may distort the ownership structure. For example, taxable agents are encouraged to invest in lightly taxed assets, leaving the other assets for tax-exempted institutional investors. Non-neutral tax treatment of capital income also provides opportunities for tax arbitrage transactions, which change the composition of private saving without raising its level. To illustrate, individuals can take out mortgage loans and at the same time contribute to pension plans. These transactions fail to raise the overall level of private saving. However, if (mortgage) interest is deductible for income tax purposes, these transactions erode the base of the income tax; the private sector benefits from tax deductibility of interest expense but does not pay tax on the interest (and other capital) income earned through pension funds. This process of tax arbitrage worsens budgetary imbalances and raises the marginal tax burden on labor income - especially if (real) interest rates are high. The worldwide process of financial liberalization enables the private sector to increasingly engage in tax arbitrage

²¹In practice, other major categories of saving, such as housing, typically enjoy fiscal privileges. Furthermore, some industrial countries have moved away from a comprehensive income tax towards a schedular income tax on capital income. Under these schedules taxes, capital income is taxed at a flat rate below the top marginal rate in labor income.

and thus exploit the non-neutral treatment of alternative forms of saving and the asymmetric treatment of interest.

The fiscal privileges for pension saving may have to be reduced in view of the drawbacks described above. Rather than providing tax breaks, governments can require individuals to save part of income for retirement. A (limited) compulsion to save does not absorb budgetary means, which are becoming increasingly scarce as tax bases become more and more mobile internationally and as the aging of the population boosts age-related public spending.²²

The tax treatment of various types of saving can be made more neutral either by reducing taxes on non-institutional saving or by raising the tax burden on pension saving. The growing international integration of financial markets makes it increasingly difficult to enforce high tax rates on capital income. Accordingly, lower taxes on financial saving should probably make the most important contribution to reducing the gap between the tax rates on institutional and other financial saving.

The tax treatment of pension saving could be tightened in two ways. First, tax privileges granted to the elderly can be abolished. This can be implemented gradually in order to protect the current retirees who have been unable to anticipate the change in policy. A heavier tax burden on retirement incomes would eliminate the effective subsidy on retirement saving originating in the gap between, on the one hand, high marginal tax rates while working and, on the other hand, relatively low marginal tax rates during retirement. Furthermore, it would strengthen the public revenue base when the elderly account for a substantial part of the population in the beginning of the next century. As the population ages and the number of elderly with high-incomes rises, taxes on these elderly become an increasingly attractive instrument to finance tax cuts for low-incomes. The second way to raise the tax burden on pension saving is to include the investment income of pension funds in the income tax net. Several countries, including Australia, Denmark, Sweden, Belgium and New Zealand have moved into this direction. Some countries have replaced implicit taxes associated with regulations affecting the investment mix by explicit taxes.

a. Investing in OECD countries

Investing pension saving domestically yields several advantages. First, investing pension savings as equity in domestic firms makes the elderly a stakeholder in the functioning of the domestic economy and raises the wages of the young. This is likely to foster intergenerational solidarity. Indeed, investing at home seems to be more appropriate in

²²However, tax privileges may help to enforce mandatory saving.

the intergenerational solidarity scenario than in the market scenario. Second, concentration of ownership of firms by pension funds may facilitate monitoring of management, thereby raising the return. Third, domestic investment strengthens the base for financing public spending.

Financial innovation can make funded schemes more attractive by raising the return, reducing transaction costs, and lowering investment risk.²³ Developing the stock market and improving corporate governance allow pension schemes to take advantage of higher returns on equity investments (see Gelauff and Den Broeder (1996)). Also deregulating and enhancing competition in goodsmarkets may raise returns. Stable and disciplined macroeconomic policies encourages long-term planning. Increased pension saving may set in motion a virtuous circle by encouraging financial innovation, improving corporate governance, and building the political support for stable and disciplined macroeconomic policies.

b. Investing in non-OECD countries

International financial markets can play a key role in enhancing the risk-return trade off on pension saving in OECD countries. In particular, by allowing OECD saving to be invested in emerging markets of the younger economies of the non-OECD countries, international financial markets can help to maintain a high return on OECD saving. Indeed, the differential phasing of aging among the OECD and non-OECD countries offers scope for mutual advantageous trade between the young workers in the emerging markets and the retirees in the aging economies. International capital markets can help also in diversifying risk and shifting risk to those who can best bear it. In particular, by investing their saving in the emerging economies, the elderly in the OECD countries are insured against adverse country-specific shocks in their own countries. Moreover, by investing in the non-OECD countries, the ageing OECD countries become stakeholders in the growth performance of the emerging countries.²⁴ This can facilitate international cooperation, thereby further reducing political risks and ensuring stable property rights and international rules of the game.

To reap the full potential of international capital flows, the competitiveness and competence of financial sectors in non-OECD countries should be enhanced. Moreover, to prevent lack of information and political risks from inhibiting capital inflows,

²³ World Bank (1995), brief 10 discusses the potential of modern financial instruments to share risks and address informational market failures.

²⁴ Fischer and Reisen (1994) elaborate on the mutual benefits of investments by OECD pension funds in emerging economies.

accounting should become more transparent and reliable, legal and supervisory skills should be improved, and remaining restrictions on capital outflows should be removed.

Also trade liberalization contributes to capital flows. Free trade mitigates medium-run movements in the real exchange rates (and hence investment risk) associated with sizable capital flows. Moreover, by raising the costs of being cut off from the benefits of trade integration, increased openness makes the commitment to respect property rights more credible. To enhance the investment climate in non-OECD countries more generally, economic reforms aimed at fostering market incentives and public infrastructures and disciplining macroeconomic policy should proceed.

Also OECD countries can facilitate mutual beneficial capital flows. Relaxing regulatory constraints on foreign investment by institutional investors allows pension funds to reap the diversification benefits associated with investment in the emerging economies.²⁵ Indeed, these regulations amount to a nontransparent tax on pension funds. Removing trade barriers and deregulating sheltered sectors prevent domestic inflationary pressures when the retired babyboom generation starts to consume capital income originating in non-OECD countries.

c. Numerical illustration

Table III.5 shows how a higher return on capital on account of more efficient financial markets, better investment opportunities in both the OECD and other regions, and improved investment strategies can help to reduce pension contributions. If the rate of return turns out to be three percentage points higher than in a benchmark scenario (6% rather than 3% in real terms), the contribution rate for the funded schemes is cut in half. Accordingly, in the three pillar system considered in section II.1, the contribution rate in 2075 is 16% rather than 23% (as in the benchmark scenario).

Table III.5 Contribution rate with interest rate +3%

	1990	2000	2025	2050	2075
	in per cent of gross wage				
Benchmark scenario	16.4	18.1	20.8	25.0	23.0
Benchmark with interest rate +3%	10.4	11.5	14.2	17.5	16.0

²⁵Providing fiscal privileges for covering pension liabilities through the balance sheet of employers (the so-called book reserves) discourages capital outflows as well.

Difference	- 6.0	- 6.6	- 6.6	- 7.5	- 7.0
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IV. CONCLUSIONS

This paper has provided a broad overview of policy options available to OECD countries to prepare their systems of old-age income support for the demands of an aging society. It stressed that not only demographic developments but also non-demographic trends will substantially affect the appropriate systems of old-age insurance. The scenarios illustrated the considerable uncertainty surrounding these non-demographic trends. Accordingly, the most appropriate strategy involves diversification over various policy measures. The discussion in the paper suggests how the policy mix selected by each individual OECD country should depend on political preferences, expectations about future developments, and the particular institution setting affecting corporations, industrial relations, and financial markets.

1. No regret strategies

Some policies are part of 'no regret' strategies because they work out well in all scenarios.

Higher effective retirement age

The most robust policy conclusion is that the effective retirement age should rise with life expectancy. A higher retirement age reduces the need for not only fiscal transfers (which is beneficial in the market scenario) but also intertemporal transfers in the form of financial savings (which is especially important in the intergenerational solidarity scenario with a low rate of return). Indeed, labor income can be regarded as a fourth pillar of old-age income insurance.

Broad-based tax system

Since the elderly lead longer, healthy lives, they should be net contributors to the budget for a longer time. Indeed, ensuring that net contributions to the budget decline less rapidly with age is a major instrument to alleviate the fiscal transfer problem associated with aging. In this connection, a higher retirement age is one instrument. Another is a broadening of the tax base by reducing tax privileges to the elderly and by making the tax treatment of capital income more neutral. Indeed, as the elderly population grows more heterogeneous, the net contribution to the budget should be based less on age and

more on income. To illustrate, old-age poverty alleviation could be financed through broad-based taxes paid by the entire population rather than through narrow-based taxes that hit only the wages of the workforce.

More efficient markets

Another robust policy conclusion is to enhance the efficiency of labor, capital, and commodity markets. A well-functioning market mechanism is a major instrument in adjusting production to new needs originating in demographic and other trends. For example, it can induce workers to delay retirement so that human capital of elderly citizens is employed to meet newly emerging needs. Moreover, efficient markets can contribute to a higher participation rate of not only the elderly but also the young, thereby mitigating the decline in the worker/retiree ratio on account of aging (see Table III.3). On the international level, efficient markets are important as well. In particular, international markets for capital, commodities, and services allow countries featuring different demographic developments to exploit their comparative advantages.

Social-security reform

A reform of the social-security system is essential to improve the efficiency of the labor-market in general. Moreover, it helps to raise the effective retirement age and the net contribution of the elderly to the budget because the elderly are especially vulnerable to moral hazard involving social security benefits. By tightening the requirements for social security benefits, "tagging" can improve the trade-off between equity and efficiency. Moreover, in addition to lower marginal tax rates, also a reduced level of insurance may contribute to more efficient retirement- and other labor-market decisions.

Diversifying risks

To diversify risks, the elderly may want to draw on a mix of assets. In particular, they can rely on human capital of the young, not only through the intergenerational contracts implicit in PAYG and DB schemes but also through explicit financial claims in DB and DC schemes. In addition, they may want to become stakeholders in foreign economies by investing their saving abroad. Finally, they can rely on their own human capital.

Pooling risks

Another major instrument to reduce risks is the tax system. By including elderly in the tax system, the tax system can play a major role in intra- and intergenerational risksharing. In this way, it can pool risks and shift the risks to those who can best bear it.

Private pension provision

Another way to alleviate the burden of the elderly on the budget is to stimulate private pension provision. Indeed, countries that currently rely heavily on public PAYG systems, may gradually reduce the benefits these systems offer to higher incomes. This would stimulate private, funded pension plans. The government could stimulate DC systems by providing inflation-indexed bonds and by conducting intergenerational risksharing through the tax system.

2. Choices and trade-offs countries face

Whereas some policy responses are robust to the major trends, others are more appropriate in specific scenarios. We now turn to some of the major trade offs countries face.

The level of saving

The first trade-off involves the level of saving. This can be illustrated with the transitional problem associated with the move from public PAYG to private funded schemes. Without an increase in the budget deficit, a rapid transition requires a substantial increase in national saving. This may carry a high price tag in terms of a high burden on current generations and a short-term decline in employment due to high labor costs and lower labor supply. Hence, a trade-off between saving and employment emerges. Moreover, the pay-off of higher financial saving may be limited if the rate of return turns out to be low. Tax incentives for private pension saving may reduce the burden on current generations. However, these incentives tend to reduce public saving and result in tax arbitrage.

The composition of saving

Countries face a trade-off in selecting not only the *level* but also the composition of saving. Saving can occur in not only financial assets but also human capital. Investing in human capital of the elderly allows the elderly to remain in the work force for longer, thereby reducing the need for fiscal transfers. Investing in human capital of the young (through, e.g., public education or public infrastructure) raises wages, thereby broadening the tax base and allowing higher PAYG benefits. However, in contrast to investments in human capital of the elderly, investments in human capital of the young do not mitigate the need for fiscal transfers. In fact, higher wage growth enhances the sustainability of PAYG schemes only if the elderly do not fully share in the productivity gains. Moreover, relying on the human capital of the young (and the implicit intergenerational contract) may impose substantial political risks on the elderly. To mitigate these political risks, the elderly can invest in young workers also by investing

their financial assets of their own country. In this way, they acquire an explicit rather than implicit claim on younger workers employed in domestic firms.

The trade-offs and scenarios

The optimal composition of the portfolio differs across the two scenarios. The market scenario features high returns on financial capital, especially on that invested in non-OECD countries. In the intergenerational solidarity scenario, in contrast, human capital at home rather than financial capital yields the highest return. Indeed, human capital is the growth motor in this scenario. Moreover, strong implicit contracts with firms and the government alleviate political risks in PAYG and DB schemes. In this scenario, the public sector and firms play a major role in providing old-age insurance.

3. We can afford to grow old

Can we afford to grow old? Fortunately, the answer is an unambiguous YES! Growing old raises the return on human capital by providing the opportunity to employ human capital over a longer time horizon. Moreover, by leading longer, healthy lives, citizens can contribute more to society in general and the budget in particular. Finally, aging allows OECD countries to exploit the comparative advantages that come with age (such as experience and financial capital) by trading with younger societies.

However, just as other trends that affect our society, aging requires countries to adapt their economies. This paper shows that countries have many alternative ways to do just that. Since aging is a rather predictable trend, countries have ample time to adjust. Indeed, we advocate that countries spread their eggs not only over various policy measures but also over time. Gradually phasing in policy measures and announcing these measures early, avoids abrupt, painful policy corrections.

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Abstract

This paper investigates how OECD countries can address the challenges posed by aging. It first explores the strengths and weaknesses of various pension systems in light of future trends. Subsequently, it illustrates the major uncertainties surrounding these trends by providing scenarios for the main future trends affecting old-age income support. To diversify risks, OECD countries should act on several fronts in order to prepare their economies for the aging of their populations. The paper outlines two major ways to deal with these demographic and other trends, namely, first, investing in human capital and, second, investing in tangible and other intangible capital. Within each of these main lines of attack, several policy measures are suggested. Indeed, in exploring policy options, we take a broad approach. Whereas several of these policy measures involve social security and pension systems, other suggested measures effect the economy more generally.

The paper concludes that, just as other trends that affect our society, aging requires countries to adapt their economies. Since aging is a rather predictable trend, countries have ample time to adjust. Indeed, we advocate that countries spread their eggs not only over the baskets of various policy measures, but also over time. Gradually phasing in policy measures and announcing these measures early, avoids abrupt, painful policy corrections.