Old Age Income Maintenance: Basic Problems and Alternative Responses

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Basic Problems and Alternative Responses

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ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

The rapid increase -- over the next thirty years -- in the population share of persons above retirement age has led to a steady increase in attention paid by OECD Governments to questions concerning old age income maintenance. The attached paper looks at the proper role the Government can play in the provision of income for the elderly. The analysis starts with a discussion of the outcomes that can be expected under private contracting, in the absence of any specific Government intervention. Equity and efficiency concerns with these outcomes are identified, and the paper then examines how alternative forms of Government intervention, including comprehensive public old age pension schemes, can potentially improve on these outcomes. Explicit consideration is given to limitations on Governments' ability to achieve desired goals, as well as market distortions introduced by Government intervention.

La croissance rapide -- au cours des trente prochaines années -- de la part dans la population des personnes ayant dépassé l'âge de la retraite a conduit les gouvernements des pays de l'OCDE à attacher de plus en plus d'importance aux questions concernant le maintien des ressources des personnes âgées. L'article suivant examine le rôle approprié que l'Etat peut jouer pour assurer un revenu aux personnes âgées. L'analyse s'attache tout d'abord à discuter les résultats que l'on peut attendre de systèmes de contrats privés, en l'absence de toute intervention spécifique de l'Etat. Les considérations d'équité et d'efficience qui s'attachent à ces résultats sont identifiées, puis l'article examine comment les différentes modalités d'intervention de l'Etat, y compris les systèmes publics d'assurance-vieillesse, peuvent éventuellement améliorer les résultats. Les pouvoirs publics ne peuvent atteindre pleinement les objectifs désirés: il est explicitement fait état des limites de leur action, ainsi que des distortions de marché créées par leur intervention.

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I. INTRODUCTION

This paper discusses problems related to income maintenance of the aged and the potential role of the Government in this area. The analysis starts with a discussion of the outcomes that can be expected under private market contracting, in the absence of any specific Government interventions. Equity and efficiency concerns with these outcomes are identified, and the paper then examines how alternative forms of Government intervention, including comprehensive old age pension schemes, can potentially improve on these outcomes. Explicit consideration is given to limitations on Governments' ability to achieve desired goals.

While this paper focuses on the role of specific Government interventions in the area of old age income maintenance, other factors have a major impact on the ability of individuals to make adequate provision for their income in old age. Concerns about private provision are lessened the lower the level of unemployment, the more efficient are financial markets, and the lower and more stable the rate of inflation. For the purposes of evaluating specific interventions however, this paper takes these parameters as given, except to the extent that Government old age pension policies may impact on them.

II. THE LIFE CYCLE MODEL: A SUMMARY

The alternative against which the results of any Government intervention should be evaluated is the outcome which would result without such intervention. With respect to the provision of income in old age, the standard model used to analyse such a counterfactual scenario (i.e. old age income provision without Government intervention) is the Life Cycle Model of Saving (LCMS).

Detailed descriptions of the LCMS are available in many places and rather than presenting another exhaustive exposition we summarise here the relevant aspects of the model for the analysis of the provision of adequate income and consumption levels in old age (1).

The LCMS assumes that individuals (or households) maximise their discounted present value of utility derived from consumption over their lifetime. Assuming a "normal" (i.e. concave) utility function, this implies that "representative" individuals will spread their consumption over their entire lifetime. Their average level of consumption will be determined by their life time disposable income, including the net income effects of taxation and transfers and real interest earnings. This in turn implies that if there is no independent income during old age they will save part of their income during the income earning stage of their life in order to finance their old age consumption from the wealth accumulated during their working life.

The size of the old age consumption stream implied by this model depends crucially on the amount of life time disposable income received (the individuals' life time budget constraints), the real interest rate, and the parameters characterising the individuals' utility functions (their "tastes"), the rate of time preference and the degree of risk-aversion in particular. Typically these parameters are difficult to measure.

The realism of the basic LCMS outlined in the preceding paragraph can be enhanced by including institutional details and/or adding further variables into the representative individuals' utility functions, e.g. saving for bequest and accumulation of precautionary reserves in response to uncertainty. Modifying the assumptions concerning these various embellishments of the basic model further increases the range of possible outcomes from the LCMS without, however, significantly changing the model's principal implications for the sufficiency or otherwise of old age consumption levels.

It has in fact been conclusively shown (Farrell, 1970) that different combinations of plausible parameter values may lead to greatly different time paths for life time consumption and saving. In particular it cannot be concluded unambiguously on the basis of the LCMS that each individual will end up with a (socially defined) "satisfactory" consumption level in old age. This is obvious in the case where individuals' life time income is insufficient, but may even hold if their life time income would have been sufficient to provide such a satisfactory consumption stream throughout their life time.

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The LCMS actually implies that the life time consumption path is monotonically decreasing (increasing) if the individual's rate of time preference exceeds (is smaller than) the effective rate of interest (i.e the discount rate). How rapidly consumption will increase or decrease over time depends on the size of the gap between these two parameters and the degree of risk aversion: a high degree of risk aversion will tend to make the time path of consumption flatter.

Given that the real interest rate is likely to exceed the rate of time preference for the majority of individuals, these theoretical results imply that normally people's consumption will increase over time, including during old age, which should reduce the probability of people ending up below a bench mark consumption level -- however defined -- in old age.

In practice individuals' consumption seems to follow disposable income more closely than is implied by the basic LCMS as outlined above. There are various reasons for this:

-- Imperfect capital markets, in particular the inability to borrow against future income, prevents individuals consuming at their expected average level of life time income in the early (low income) stages of their life cycle;

-- Individuals may be myopic, wrongly expecting current income to be the best predictor of future income, thus ignoring trend productivity increases (and the decline of income in retirement);

-- Counting expenditure on consumer durables as consumption rather than saving (and other measurement problems) may reduce the precision of the measured saving rate as an indicator of "true" (economic) saving;

- Introducing income uncertainty into the LCMS results in an overall increase in saving (in order to build up precautionary reserves), but also entails a closer correlation of consumption and income under utility maximising behaviour (Nagatani, 1972).

Overall the tendency of income and consumption to be correlated in the short run (i.e. on a yearly basis) tends to lower the consumption level during old age when earned income is very low or zero.

The probability of individuals ending up with old age consumption below a level judged socially adequate depends of course on where this consumption level is set: the higher it is in relation to the life time budget constraint, the larger the number of people likely to end up below such a bench mark.

Introducing uncertainty into the LCMS has an ambiguous effect on the likely incidence of insufficient old age income. On the one hand existence of uncertainty as such will -- other things being equal -- increase individuals' propensity to save if individuals are -- as is generally assumed -- risk averters. This in turn will increase their accumulated wealth from which to finance consumption in old age. Many of the risks arising from future uncertainty can be controlled by entering private insurance contracts. However, there are important social risks (e.g. unanticipated inflation, war) against which private insurance coverage is limited, and which increase the possibility of retired people ending up with insufficient private means to finance their old age consumption.

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The above does of course not mean that private arrangements for old age consumption will necessarily be insufficient. Whether ‿they actually are, and to what extent, is an empirical question. In this regard both historical as well as contemporaneous evidence strongly suggest that exclusive reliance on private provision -- including by charitable organisations -- of old age income does not prevent significant hardship.

The next chapter looks at the major reasons which may account for the failure of private arrangements to lead to satisfactory consumption levels in old age.

III. CONCERNS WITH PRIVATE OLD AGE INCOME PROVISION

Concerns commonly identified with respect to outcomes from private provision of old age income comprise both efficiency concerns and equity concerns. In addition, the role of private transfers in old age income provision touches on both of the concerns, and these three topics are discussed in the following sections.

A. Efficiency Concerns

Many of the efficiency concerns seen with private provision arise from uncertainty and risk in providing for income in old age, and with the perceived difficulties of individuals and markets in dealing with them. Uncertainty and risk surround such factors as length of life, length and continuity of working life, the occurrence of costly events (accidents, illness), and the return on physical and human capital. There are a number of market mechanisms for dealing with risk. They include private superannuation, contractual insurance, diversification and hedging, and self-insurance in the form of both contractual and voluntary saving. The extent to which these mechanisms are capable of dealing with the risks associated with old age income provision will be examined in section (ii) below. First, however, consideration will be given to individual decision-making under uncertainty.

i) Decision-making under uncertainty

So-called "optimality models" of private market outcomes depend on strict conditions concerning the nature of decision-making under uncertainty. In general, the models show that competitive markets maximise *ex-post* welfare only if individuals, *ex ante*, are the best judges of their welfare in all possible contingencies, and if they evaluate contingencies in a consistent manner, in accordance with the expected utility theory of choice under uncertainty.

In practice many of these assumptions are unrealistic characterisations of individual decision-making. From this it does not follow, however, that there is market failure unambiguously justifying Government intervention. Moving to the assumption of "bounded rationality" -- i.e. intendedly rational behaviour subject to people's limited ability to perceive, process, store, and retrieve information -- and recognising the existence of transactions costs (for example the costs of acquiring information) leads to a much more realistic analysis of decision-making under uncertainty. It thus provides a more relevant test for the ability of government intervention to improve outcomes.

Rules of Thumb

In considering how "boundedly rational" individuals make decisions under uncertainty, it is useful to look at the significant body of evidence from psychology derived from "laboratory" testing in which individuals are presented with hypothetical choice problems. It has been found that under conditions of uncertainty, individuals use rules of thumb (heuristics), rather than

calculations of probability. Rules of thumb simplify the complex tasks of assessing probabilities and determining expected values. Psychologists have identified some of the more common rules of thumb and argue that, while they are economical and usually effective, they lead to systematic and predictable errors in terms of actual probabilities and statistical rules.

A survey of the cognitive psychology literature reveals the following findings (2):

a) One of the characteristics of rules of thumb has been termed "availability"; it refers to the fact that people often judge an event as likely or frequent if instances of it are easy to imagine or recall. Because frequently occurring events are generally easier to imagine and recall than rare events, availability is often an efficient rule of thumb. However, availability is also affected by numerous factors unrelated to frequency of occurrence, such as the recentness of infrequently occurring events like natural hazards (3). Studies have shown media coverage to be biased in its reporting of different causes of death in relation to their probabilities, and that people's judgements of the relative incidence of different causes of death accord closely to their relative newspaper coverage. The high level of publicity devoted to air accidents may then explain the relatively frequent purchase of air travel insurance compared with insurance for more risky activities.

b) People have been found to place great confidence in judgements based upon rules of thumb. For example, 30 per cent of respondents in a US experiment gave odds greater than 50:1 to the (incorrect) assertion that homicides are more frequent than suicides (illustrating misplaced reliance on rules of thumb due to skewed availability of information: homicides tend to receive greater media coverage).

c) There is evidence that individuals revise their assessments of risk in a conservative manner when presented with new information. This seems an efficient rule of thumb, given the costs of evaluating additional information, and uncertainty about its representativeness in relation to the individual's existing stock of knowledge and assessments. In areas of activity where individuals make numerous decisions over time, and therefore receive considerable feedback from outcomes by which to judge the quality of their decision rules, their behaviour may adapt over time to more accurately reflect or track real probabilities. On the other hand, where activity is only limitedly repetitive, outcome feedback is restricted, and individuals may persist with rules of thumb derived from misleading samples of information. The evidence with respect to under-insurance for low probability, high loss events such as earthquakes appears to support this conclusion (even allowing for the possibility that people under-insure in the expectation that the Government will compensate them for losses should an earthquake occur).

In attempting to apply the insights from psychology about decision-making under uncertainty to private provision of old age income, it should be noted that "retirement" is an event that for most people has an expected probability of one (retirement meaning loosely to leave the paid full-time workforce). The long time horizon involved in retirement saving, however, makes it difficult for people to imagine their circumstances and

preferences in old age, and to relate these to their current consumption/savings decisions. An American survey suggests that even among non-retired people over 55 years of age, many remain unaware of impending retirement needs, or of the resources they are likely to have to finance them (4). One possible explanation for this is that reliance on the "availability" rule of thumb may limit people's perceptions of the nature and extent of the risk of poverty in old age. Conservatism, together with over-confidence in the rule of thumb, may then act to limit adjustments of behaviour in the face of additional evidence over time concerning the nature of the risk. The fact that retirement is generally a one-off event means that direct feedback about the appropriateness of one's own earlier decisions is lacking (although evidence is available from the experiences of others).

Cognitive Dissonance

Akerlof and Dickens have incorporated into an economic model further observations from psychology relating to a particular type of cognitive bias known as cognitive dissonance. It attempts to explain why workers in dangerous jobs often seem to be unaware of the dangers involved. Cognitive dissonance theory suggests that people not only have preferences over different states of nature, they also have preferences about their beliefs of what these different states are (5). In their model, Akerlof and Dickens argue that safety legislation can enhance efficiency in the presence of cognitive dissonance. One application of the theory they suggest is to post-retirement income. "If there are some persons who would simply prefer not to contemplate a time when their earning power is diminished, and if the very fact of saving for old age forces persons into such contemplations ... they may make the wrong tradeoff, given their own preferences, between current consumption and saving for retirement." They see this as analogous to their model concerning safety legislation, and argue there may be a case for compulsory old age insurance.

Cognitive dissonance may be present with respect to some of the risks associated with old age income maintenance (e.g. length and continuity of working life, the occurrence of costly events), which may lead people to under-save. Cognitive dissonance with respect to length of life on the other hand might be expected to lead, everything else being equal, to over-saving. There is some support from the cognitive psychology school for the existence of cognitive dissonance with respect to length of life -- one study found that the great majority of individuals believe themselves to be more likely than average to live past their eightieth birthday. The net effect of cognitive dissonance on saving for old age therefore appears ambiguous.

Myopia

A further factor frequently referred to in discussion of saving for old age is that of myopia, the contention that individuals tend to place undue weight on short-term benefits at the expense of longer-term considerations, and regret it later. The contention is often used as justification for the Government introducing a compulsory pension scheme to force people to save for their retirement. This can be a type of "merit good" argument, in which individual saving for retirement is seen as having a value to society over and above the value placed on it by individuals.

It is important to note however that people are not incapable of recognising their susceptibility to myopia, nor of taking action *ex ante* to counteract it. This explains the widespread occurrence of "voluntary

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compulsion", in which individuals lock themselves into long-term arrangements or otherwise limit their scope for myopic behaviour. Thaler (1983) has termed this "rational precommitment". Examples range from the mundane (putting the alarm clock out of reach), through saving schemes such as Christmas Savings Clubs (which offer a lower rate of interest than normal deposits in return for the bank making it less easy for the depositor to withdraw their money), to mortgages and pension schemes (the latter typically offering significantly inferior rates of return until the funds have been invested for some time). Anecdotal evidence suggests this type of behaviour is in fact ubiquitous.

There are also similar features in the labour market that bear specifically on retirement saving. Many employers offer deferred compensation such as subsidised pension schemes to their employees as part of the total remuneration package. Membership in such schemes can be compulsory on entering a firm. In a competitive labour market, firms offering pensions are likely to offer lower initial wage rates. The occurrence of occupational pensions may therefore suggest an element of voluntary compulsion on the part of employees. Thaler and Shefrin (1981) have advanced such a "forced savings" argument for the occurrence of occupational pensions. [See Section (ii) below for further discussion on this issue.]

It is incorrect, then, to move from an assertion that (some) individuals are myopic, to the prescription that the Government should therefore compel all citizens to save for their old age, without considering the extent to which voluntary contracting is capable of addressing concerns in this area. In addition to "voluntary compulsion", the analysis in Part II of the paper suggested there are features of the capital market (the inability to borrow against future income) that may lead people to under-consume in the early stage of their working lives. Superimposing on this situation a compulsory saving scheme for old age may reduce rather than increase welfare.

There are obviously limits to the extent to which voluntary contracts can limit the accessibility of contributors' funds. Houses can be sold or superannuation schemes withdrawn from (if necessary by changing jobs). But there are clear advantages to the individual in retaining such flexibility. While at any time individuals may decide they want to lock themselves into a long term arrangement, at a later time and in different circumstances they may want to override their earlier decision. To argue that Government-compelled saving for old age represents voluntary compulsion on the part of voters requires an explanation of why anyone would want to deny themselves the possibility of subsequently changing their minds. It also requires an explanation of why they would choose to give up this right to an entity that is popularly regarded as highly susceptible to myopia itself (i.e. short-term political expediency).

Change in preferences

A further relevant case to consider is that of non-constant inter-temporal utility functions, a problem of which myopia is actually a special case. The long time horizons associated with retirement saving make it difficult for individuals to envisage their preferences at some (more or less) distant point in time. Where there is a long-term rise in living standards over the working life of an individual, saving for a target consumption level in retirement that seems adequate initially may imply social deprivation by the time retirement occurs in 20, 30 or 40 years time. Increases in life expectancy during an individual's life time add an additional element of

uncertainty. For example, life expectancy at birth increased by close to five years over the postwar period in many OECD countries. On the other hand, if people over-estimate the risks, or some of the parameters subsequently change so that the need for retirement saving falls (e.g. because by the year 2020 it is the norm to work until one's late 60's or later), over-saving may result.

Reinforcing the problem of unstable preferences is the element of irreversibility While some people reaching retirement age who feel they have inadequate savings will have the option of continuing in employment, others may for a variety of reasons -- ill health, decline of strength or faculties -- not have this option. Even for those who do, the long time horizons involved mean that to a large extent the decisions taken earlier in their lives over providing for retirement are irreversible. The following table illustrates the importance of the long time horizons involved in retirement saving:

(Table 1. Percentage of stable salary that can be provided as a pension if
12 per cent of salary is saved each year)

Anxiety Costs

Given certain features of retirement saving - the long time horizons involved, the uncertainties surrounding various elements, the irreversible nature of many decisions - a case might be made that there is a potential role for Government in reducing "anxiety costs". The introduction by Government of a compulsory minimum saving scheme might, it could be argued, remove some of the uncertainties among the current working population about appropriate saving levels, hazards of myopia, and the risks of starting to save for retirement too late in life. Government actions affecting retirement saving may also however create anxieties of their own (e.g. frequent changes to Government schemes, or to policies that bear on private arrangements). A comparative approach is called for that weighs the costs and benefits of various mixes of market arrangements and Government involvement. This is carried out in Part V of the paper.

Conclusion

The insights from cognitive psychology, together with observations of actual behaviour, cast some doubt on the ability of individuals to make utility -- maximising choices between consumption now and in old age. It is a large leap however to conclude that the Government should intervene. First, intervention to "correct" for poor decisions by some is likely to impose costs on others, who are already making adequate saving decisions for old age. Secondly, those involved in selling retirement saving instruments have an incentive to publicise the risks involved, the consequences of imprudence, and the need to start saving now. Their advertising may play on people's concerns, in an attempt to prompt them to save for their old age. Thirdly, while some may still elect, due to bounded rationality, not to provide for their old age, there is a real question concerning the Government's ability to do better.

For the possibility of Government failure must also be allowed for. While the evidence in the preceding section leads to the conclusion that individual decision-making exhibits predictable errors, no-one would want to argue that collective choice processes are error-free. Public policy design must be based on comparison of feasible alternatives, not on a perceived failure of markets to achieve an "optimal" outcome, in comparison with an idealised Government intervention.

For the Government to improve outcomes resulting from decisions under bounded rationality, the following conditions must be met:

-- Government policy analysts must successfully identify the areas of activity where individuals predictably make "mistaken" decisions;

-- They must then devise sets of policies that successfully correct (or compensate for) those "mistakes", and that do not in turn lead to costs (excess burdens, disincentive effects) outweighing the benefits of the intervention. The relative advantages of the different policies must be spelled out;

-- From these policies, one must be endorsed and introduced by politicians, who correctly interpret the level of public support for it.

As outlined in Part IV of the paper, there are a number of concerns about the efficacy of the collective choice process under a democratic system of government. These centre on the agency problems facing citizens in controlling the behaviour of politicians and bureaucrats. Before recommending any Government intervention to improve on the outcomes of private voluntary activity, therefore, the analyst must be confident the existing, less-than-perfect political process is likely to achieve a better result. This suggests great caution in making paternalistic assertions of the type "The Government knows what is in individuals' interests better than the individuals themselves".

ii) Market Mechanisms for Dealing with Risk

a) Contractual pension schemes (superannuation)

Superannuation is an important method of transferring income from working years to retirement. Schemes can be classified as either occupational (also known as employee), or personal. The former is generally established by an employer as part of their overall remuneration package, with contributions paid by both employer and employee. In addition to providing a retirement pension, or a lump-sum on retirement, occupational schemes typically also provide death and disability benefits. Most large firms administer their own superannuation schemes, while smaller firms may choose to contract for some or all of the services involved -- portfolio management, provision of death, disability and pension benefits -- to be performed by financial intermediaries such as specialist superannuation companies and life insurance companies. Personal schemes are those established by individuals directly with financial institutions.

There are two main types of employee superannuation schemes:

-- Defined contribution schemes, also known as cash accumulation schemes. (All personal schemes are defined contribution schemes.) In these schemes contributions are defined in advance, usually as a fixed percentage of each employee's salary, and the retirement benefit is the accumulation with interest of the employee's and employer's contributions, the member's share of the fund's investment earnings, and (sometimes) a share of savings left behind by employees

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who resign and do not receive the full amount of the employer's contribution;

- - Defined benefit schemes, where each employee contributes a fixed percentage of salary, with the employer's contributions varying on regular advice from an actuary in order to meet the cost of providing the defined benefits. The benefits payable are determined by formula, usually as a percentage of each member's average salary for a period before retirement, multiplied by the number of years of membership in the scheme. Since benefits are defined, no separate account is kept of each member's share of the fund.

The differences between defined benefit and defined contribution schemes include the following:

- - Under a defined benefit scheme any loss from an ex post difference between payments and contributions plus earnings is usually met by the employer, who thus bears the risk.

- - In calculating the retirement pension, a defined benefit scheme places greater weight on earnings in the years immediately preceding retirement than does a defined contribution scheme. This means that those employees whose earnings profile rises throughout their careers (typically executive staff), receive a pension that is higher as a percentage of their pre-retirement income under a defined benefit scheme.

One feature shared by both defined benefit and defined contribution schemes is that of non-vesting i.e. an employee has legal claim to the employer's contributions only after a certain period of employment, and on resigning may receive less than the full amount of their employer's contributions. It is often claimed that non-vesting creates disincentives for scheme members to change jobs, and can thereby inhibit labour mobility. In some countries this has led to Government regulation requiring vesting of a proportion (or all) of the employer's contribution in the employee after a certain period of service.

In considering the desirability of Government regulation of occupational superannuation, it is necessary to consider why superannuation occurs as part of employee remuneration. The motives of employers in offering superannuation - - aside from the tax advantages that often apply - -. include the following:

- - A remuneration package involving lower initial wages and a deferred pay element can function as a screening device in situations where potential employees know more than the firm about their likely productivity on the job, and their inclination to remain with the firm for some time;

- - A superannuation scheme in which benefits depend on salary in the final years of service can create incentives for employees to maintain their performance throughout their careers, to invest in human capital, and to aspire to senior positions within the company rather than changing employment;

- - A non-vested superannuation scheme can provide an employer with collateral against the possibility of employee shirking or dishonesty

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(i.e. a form of solution to agency problems), and against the risk of capital loss when an employee, trained at the employer's expense, resigns;

-- Schemes in which pension benefits depend on pre-retirement salary levels ("final salary schemes") can give the firm some scope to match career remuneration with ex post observations of workers' productivity and honesty;

-- A less than fully-funded pension plan may reduce the scope for opportunistic behaviour by the workforce that might place the firm in jeopardy. (There is some evidence in the US that firms with unionised workforces fund their pension plans to a lesser extent than firms with non-unionised workforces.)

-- The availability of a pension may make compulsory retirement provisions more acceptable to employees, acting as severance pay for workers who at retirement age may be receiving remuneration higher than their productivity. Defined benefit plans in fact provide a disincentive to continuing employment past retirement age, because benefits generally do not increase after the normal retirement age to reflect either the deferral of the benefit or the additional service.

-- The provision of pensions can aid in establishing "good employer" status with employees and potential employees. By showing concern for the standard of living in retirement of long-serving staff and dependents, a firm may avoid bad publicity and moral pressure arising from poverty among former employees.

From the employee's point of view, there are some disadvantages in superannuation being part of the remuneration package. It is a less liquid form of pay, typically only accessible on resignation. It involves some risk on the part of the employee, imposes information costs for monitoring that risk, and will normally entail lower initial wages compared with a job offering no superannuation. The reasons that employees may nevertheless prefer some remuneration in the form of superannuation (other than the preferential tax treatment that typically applies) include:

-- Employers offering superannuation may be more willing to finance training of employees, hence raising their potential career earnings profile;

-- Employers' willingness to pay more over the lifetime of the employee compared to a situation where pay is matched to productivity each year (because of the advantages to the employer of a deferred pay contract);

-- A lowering of the employee's tax liability over the life cycle under a progressive income tax scale;

-- The "voluntary compulsion" element referred to in the previous section - employees may wish to lock themselves into long-term retirement saving to limit their scope for myopic behaviour.

Whether non-vesting reduces labour mobility is not obvious *a priori*. Non-vesting creates a cross subsidy, from those workers who leave the firm

early to those who remain with the firm. Those who remain beyond vesting will receive total remuneration per unit of time worked in excess of their marginal product, inducing them to further remain with the firm. It is this effect which leads many to the conclusion that non-vesting reduces labour market mobility. However, those who leave before vesting occurs will receive compensation less than their marginal product, and this can be expected to cause them to leave even earlier. Non-vesting may therefore lengthen the tenure of "stayers" but shorten the tenure of "leavers". The overall effect of non-vested pensions on average mobility therefore depends on the relative size of the "stayer" and "leaver" groups, and on the strength of the shortening and lengthening of tenure effects (which in turn depends on the opportunity costs of work for each group).

In a situation where leavers subsidise stayers, it can be expected that some firms will cater only to leavers, offering no pension and paying higher wages. In this way, the existence of non-vested pensions may lead to self-sorting of employees in the labour market between industries where long-service is important to the employer, and those occupations where it is less important and higher wages are substituted for a pension scheme. Employees self-select the remuneration package that best suits their preferences for stable employment, job variety/flexibility, and "forced saving". Viewed in the context of the total labour market therefore, non-vested pensions would not necessarily reduce labour mobility in aggregate, but segment the market into more or less mobile groups according to employer and employee preferences. This conclusion is not inconsistent with the empirical finding that defined benefit superannuation schemes increase the average length of service of employees.

However, the preceding argument ignores the impact of pension schemes on the demand for jobs that offer them. If employers with pension schemes are willing to offer higher lifetime compensation and additional training to their staff, (as a result of benefits to them of non-vesting), then additional employees are likely to be induced to join such firms, and aggregate labour mobility will be reduced.

Even accepting that occupational superannuation may reduce labour mobility, however, it must be recognised that there are benefits that arise from a lower labour turnover. These include lower recruitment costs, enhanced willingness of employers to train staff, and enhanced incentives for increased productivity. In a competitive labour market and in the absence of Government interventions, employers and employees can be expected to weigh the costs and benefits of limited vesting of superannuation, and negotiate mutually beneficial employment contracts. Government intervention to require a higher level of vesting of occupational superannuation schemes is likely to reduce the willingness of employers to train staff. It also may reduce incentives for honesty and productivity, and would increase the cost of funding schemes with limited vesting, leading to reduced benefits or increased contributions by employees and employers. It may also cause employers to offer superannuation to fewer staff. It would seem inequitable to penalise employers who do offer superannuation to their staff without imposing any similar liability on employers who do not. Furthermore, even with compulsory vesting, final salary schemes would continue to function as a disincentive to mobility.

There is one caveat to the above. It is sometimes argued that unions disproportionately reflect the preferences of older, less mobile union members, and that this leads to unions negotiating employment contracts that favour this

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group through limited vesting superannuation. This is an argument about the efficiency of the principal/agent relationship in the union movement. To the extent that it has some validity, reform of the regulatory environment pertaining to unions would be the way to proceed.

The conclusion therefore is that there are no labour market reasons justifying specific regulation of occupational superannuation. (Prudential supervision will be required, but is not considered in this paper). Second best arguments, relating to counteracting the effects of other Government interventions, are considered later in the paper in the discussion of tax concessions to private superannuation schemes.

b) Insurance

Insurance is an instrument for protecting against the risk of adverse future outcomes. In return for payment of a sum or premium now, a guarantee is obtained that a prescribed quantity of resources or set of activities will be received or performed in the future, conditional upon a specified event occurring.

The insurance elements in providing for old age income include the uncertainty of length of life, and length of working life. Detailed and relatively stable actuarial life expectancy tables exist which allow a widespread market for life insurance, through which individuals provide for dependents in the event of their death. Life insurance payments may be an important element in the income of a surviving spouse. Pure life insurance is not however, an instrument that provides income for one's own old age. The risk for retirement is that associated with the length of time after a person stops working, and before he/she dies. While the probability of the latter event is readily calculable that of the former is not.

Diamond (1977) has argued that the risk associated with length of working life has two elements -- a possible decline in earning abilities (due, for example to obsolescence of skills, declining strength, compulsory retirement etc) and a possible increase in the disutility of work. For any individual, he argues, this risk is a large one, because early retirement both shortens the length of working life during which one can save for retirement, and lengthens the retirement period which such savings must finance. The latter factor is relevant unless early retirement is associated with an event that shortens life expectancy, or itself shortens life expectancy.

The risk of length of working life is not one for which insurance is available (although there are a number of market mechanisms which reduce the risk, such as redundancy benefits). The reasons would appear to be the moral hazard and adverse selection problems that arise from information asymmetry concerning such factors as individual employment prospects, motivation, strength, health status and so on (6). Moral hazard also affects any Government scheme, and "under-insurance" as a result of moral hazard can be seen in features such as minimum retirement age which are present in state provided schemes.

The ability to calculate actuarial life expectancies does allow a private market in annuities, in which contracts specify contributions in relation to age (i.e. the insured bears fully the risk of length of working life), and the risk of length of life is shared between the individual and the institution In the presence of asymmetric private information, private

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annuity markets suffer from adverse selection. However, there seems no reason to believe the Government could have any better way of assessing the risk category of an individual insured, and therefore of improving efficiency by itself offering annuities. Compulsory risk pooling is one way of addressing the adverse selection problem - the Government could compel all individuals to purchase annuities based on the average risk of the pool. However, this would entail redistribution ex ante, from low risk to high risk groups, and it is questionable whether this would enhance society's equity objectives.

In many countries annuity markets are not well developed. A possible reason for this is that annuities are often subject to discriminatory tax treatment, entailing double taxation relative to other forms of saving. Neutral tax treatment is essential for annuities, and may allow the development of new annuity instruments, such as a reverse mortgage market, which would allow the retired to annuitise (part of) the value of their homes.

Independence of individual risks is an important precondition for the viability of private insurance markets. One problem posed for private annuity markets, and other forms of saving, is that of unanticipated inflation, which impacts on the ability to save for an assured level of consumption in old age. Private markets do not offer insurance against the risk of inflation. One reason is that unanticipated inflation affects all people simultaneously and a precondition for insurance -- the pooling of independent risks associated with a range of expected losses -- is absent. In theory, risk pooling may be achieved by combining inflation insurance with insurance against other events that are negatively correlated with inflation; or by pooling inflation insurance across countries. In the former case, it is difficult to envisage an insurable event that is negatively associated with inflation. The latter would require that the inflation experiences of the different countries be out of phase (which historically has not been the case), and that private inflation insurance be offered in other countries (which appears not to be the case either). The lack of private insurance instruments that protect against the risk of inflation does not however automatically indicate a potential role for Government in offering such instruments. Other market mechanisms -- diversification and hedging -- must first be analysed as methods of protecting against this risk.

c) Diversification and hedging

The divisibility of wealth allows the use of two mechanisms to reduce risk -- diversification and hedging. Diversification is the division of one's assets or liabilities in such a way that the risks different parts of the portfolio face are uncorrelated. To the extent that risks in a portfolio are positively correlated, they cannot be reduced by diversification. The non-diversifiable part of the risk of a portfolio is known as its systematic or market risk, while risks that can be diversified away are unsystematic or unique risks. Hedging, on the other hand, is the pairing of negatively correlated risks of the same magnitude.

The characteristics of financial risk allow not only the division of risk but also its aggregation. These two characteristics together allow specialisation in the bearing of risks. Many financial institutions have as part of their functions the aggregation of risks taken by different people. These institutions can then reduce the aggregate risks to their net worth by diversification and hedging. In a competitive market the price such specialists will charge for bearing risk will reflect only that part of the

risk they take which cannot be diversified or hedged away.

It is sometimes argued that the private capital market fails to provide scope for small investors to hold a diversified range of assets, because of the information costs and sophistication required for small investors to choose between the bewildering array of financial investments available. But providing this "sophistication" to small investors is precisely the service that private life insurance and superannuation companies (and indeed many other financial intermediaries) provide. Superannuation funds, for example, typically invest in a diversified portfolio of real property, government stock, other fixed interest securities, and equities to achieve the best mix of yield, liquidity and safety. Although the transactions costs of acquiring a diversified portfolio of assets may be higher for small investors, relative to returns, than those applying to larger investors, this does not imply any "market failure" nor any rationale for government intervention. The latter is only justified if it can be shown that government can provide these investors with higher returns at the same level of risk and without additional cost.

Some writers assert that Government can do this. The life insurance industry, they argue, is characterised by a decreasing marginal cost as one moves from individual policies to group policies to public pension schemes. Buyers' costs decrease continually, costs for salesmen are eliminated, and economies of scale in administration costs may be fully exploited. However if transactions costs were large, and could be significantly reduced through Government intervention, it would seem likely that the decreasing costs associated with large scale operations would lead to reductions in the numbers of private insurance companies, perhaps even the domination of the market by a single firm. Yet the market for pension and life insurance seems very far from being concentrated to this extent. One explanation may be the existence of reinsurance, which allows economies of scale to be exploited without industry concentration.

There is one potential means available only to Government, however, through which it is sometimes argued it may be possible to lower transactions costs, and that is the introduction of a compulsory (public) pension scheme. The argument is that selling costs in insurance and superannuation are large, and that a relatively simple device (such as payroll tax) for Government compulsion is available which would enable much of these selling costs to be avoided. There are a number of difficulties with this argument. The first is that, to the extent private superannuation continues to exist alongside the Government scheme for those for whom the State scheme provides insufficient cover, transactions costs will not be lowered, but rather duplicated. Secondly, some of the selling costs represent the costs of marketing different policies to meet the varying needs of individual buyers, and of assessing applicants' risk category. A compulsory Government scheme will be less likely to offer flexibility to meet individual preferences and risk categories. Thirdly, the absence of competitive pressures on a Government-run scheme is likely to reduce administrative efficiency and will inhibit the development of new products, or new production methods. Fourthly, any tax/benefit system involves efficiency losses in comparison to private contracting, due to adverse incentive effects, the costs of compulsion and so on. These efficiency costs are detailed in Part IV.A of this paper). And finally, taken to its logical conclusion, the single-seller-plus-compulsion argument would justify the Government supplying every good and service in the economy. There does not seem to be a convincing case for the Government to introduce a compulsory retirement savings scheme in order to economise on transactions costs.

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The role of diversification and hedging as protection against the risk of inflation -- i.e. the risk of low or negative real rates of return on saving -- is more complex. Investment in real property is one method of hedging against unanticipated inflation. Studies of the long run performance of sharemarkets in various countries show that, over long time periods equities have proved an effective hedge against inflation (7):

-- A study by Ibbotson and Sinquefield of the performance of securities in the US between 1926 and 1981 found that the Standard and Poor's Composite Index yielded an average annual real rate of return of 8.3 per cent, (compared with 0.9 per cent for Corporate Bonds, 0.3 per cent for Government Bonds and 0.1 per cent for Treasury Bills);

-- A study by Hatch and White on achieved rates of return for a portfolio of 763 Canadian Stocks and Federal Government long-term bonds and bills between 1950-83 found a compounded annual real rate of return ,of 6.7 per cent on common stocks, -0.62 per cent on long-term bonds, and 0.71 per cent on Treasury Bills;

-- A study by Barclay's de Zoete Wedd (BZW) of the real performance of a portfolio of shares in the London Stock Market between 1918 and 1984 found an annual real rate of return of 7.3 per cent;

-- A study by Frank Russell International of the performance of Australian stocks between 1900 and 1985 found an average real rate of return of 8.5 per cent;

-- A New Zealand Treasury study of the real return on equities in New Zealand between 1957 and 1987 found a real rate of return of 8.62 per cent, and on Government bonds of -1.07 per cent.

An appropriately spread portfolio of equities then is, in the long term, capable of providing investors with a before tax rate of return significantly in excess of the rate of inflation. Long-term bonds and Treasury Bills on the other hand appear on the above evidence to achieve (around) zero before tax real rates of return, the margins between their yields and equity yields reflecting the market risk premium. A diversified portfolio of equities, long term securities and real property thus appears capable empirically of providing a positive before tax rate of return while meeting liquidity and safety requirements.

The question arises as to how equities perform during shorter periods when inflation is rising. A 1983 OECD study of the effects of inflation on income, saving and wealth in the six major OECD economies between 1970 and 1979 showed the following pattern:

-- In the majority of countries, increases in the values of equities did not keep pace with the rate of inflation;

-- Non-financial corporate enterprises, by holding net financial liabilities, consistently recorded real net holding gains;

-- Financial institutions showed consistent real net holding losses, most of which were attributed to life insurance and pension funds.

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(This may be in part due to regulatory regimes that restrict the
investment activities of pension funds);

-- The household sector showed consistent real gains on tangible assets,
largely attributed to owner-occupied housing.

The BZW UK study noted above found that while equities have proved a long term
hedge against inflation, one of the most striking features about their
performance is that they have done much better in periods of low or declining
inflation. Investors in equities have suffered real losses whenever inflation
has taken off and it has often taken as much as a decade before they recouped
their losses.

Inflation, of course, affects everyone in the community. Are there any
reasons for believing the retired may be particularly adversely affected? One
may be that their portfolios are such - they seem likely to be relatively free
of debt and are more likely to be reliant on nominal incomes that do not keep
up with inflation -- that they suffer a larger wealth decline than other
groups. Studies by Okun (1970), Brimmer (1971), and Bach and Stephenson (1974)
found that the elderly suffer disproportionate losses. Okun concluded that the
"... retired aged are the only major specific demographic group that I can
confidently identify as income losers", although few detailed studies of
inflation effects on incomes by age groups are available for the majority of
OECD countries.

However, inability to earn at least a zero real rate of return on a
private sector portfolio does not indicate market failure. Inflation merely
results in transfers of income (net of efficiency losses). A negative real
return on an appropriately spread private sector portfolio may therefore occur
because inflation results in a net wealth transfer from the private sector to
the Government. This could arise because of the interaction of inflation with
a nominal, progressive income tax (fiscal drag), and the treatment of interest
income under such a nominal income tax. The latter represents in effect a tax
on capital.

The absence of any private market instrument offering an assured real
rate of return may well indicate the presence of an implicit Government tax.
It may also indicate an inability of the private sector to offer assured real
rates of return at a price investors are willing to pay to avoid inflation
risk. There are two possible responses to this. One is to move to a real
income tax system. The other is for the Government to offer inflation-indexed
investment opportunities. Reasons why the Government may be able to do this at
lower cost than the private sector include the fact that the Government is in a
position to influence the rate of inflation, and may also be better able to
hedge against the risk (due to the nominal income tax system). Society faces
moral hazard due to the government's ability to inflate away the value of its
debt To the extent some of its debt was indexed this moral hazard would be
reduced However, introducing indexed bonds would not enable the private
sector to offer assured real investment opportunities if the tax system remains
a nominal one.

B.   Equity Concerns

The test of efficiency generally ignores the distribution of income and
wealth in society. The degree of efficiency is commonly understood to refer to
the amount of wealth obtained from a given set of resources, and their initial

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distribution. Concerns about the fairness of private market outcomes, as opposed to their efficiency, are commonly called equity concerns. One approach to equity is to focus on the fairness of initial opportunities and social processes, another to focus on the fairness of outcomes. With respect to private provision of old age income, the following equity concerns can be identified:

-- <u>Equity of opportunities and processes</u>: an individual's ability to accumulate claims on consumption in old age will be influenced by different initial endowments (such as human capital potential), and different education and wealth levels on entering the workforce. During individuals' working years different income and wealth levels will also have an important effect. Those on lower incomes may face needs that are sufficiently pressing as to lead them to put little or nothing aside for their retirement. Others may reach retirement age with inadequate resources due to periods of unemployment, illness, accidents and loss or erosion of the real value of savings. Those who spend significant periods of their working lives out of the paid workforce -- raising children or caring for dependants -- will find it particularly difficult to generate, from their individual resources, cash incomes for old age, although they may (expect to) receive support from their spouses. The opportunity for employees to participate in an occupational superannuation scheme is likely to be skewed in favour of certain groups -- males, higher income groups, full-time workers, public sector employees -- certain industry sectors etc. The use of immutable individual characteristics such as sex and race in actuarial calculations, and age in mandatory retirement policies, may also give rise to equity concerns;

-- <u>Equity of outcomes</u>: the main equity concern commonly associated with old age is that no-one's standard of living should be below a certain minimum. Establishing the minimum is the task of society through the political process. Currently it seems generally accepted in all OECD Member countries that the state should ensure every person -- regardless of age -- has an income sufficient to provide a basic living standard.

A further equity of outcome concern often noted is the fall in income that typically occurs on retirement, irrespective of whether the resulting standard of living is above or below the minimum. There appears to be no case for taxpayer support of earnings replacement above the minimum income support level, nor for Government to compel individuals to save in an earnings-related contributory scheme:

-- First, retirement is an event that can be foreseen, and so the argument for earnings-related support made in other areas - that it is necessary to help meet commitments entered into on the basis of the reasonable expectation that current income levels will not be interrupted -- does not apply. There is a much stronger case for providing earnings-related income support for the unemployed than for the elderly;

-- Second, there are adequate market instruments available to enable individuals to save to maintain a higher than minimum income level in old age if they wish and are able to;

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-- Third, earnings-related support significantly increases the degree of intervention, and therefore the potential potential extent of efficiency and welfare losses;

-- Fourth, earnings related income maintenance would perpetuate in old age the inequities arising from differential access to incomes during people's working lives;

-- Fifth, tax-funded old age income maintenance is likely to lead to adverse redistribution (i.e. a violation of vertical and horizontal equity), with low-income tax-payers subsidising retired people who have higher living standards, and taxpayers with the same lifetime earnings receiving differential treatment depending on the shape of their life cycle earnings path;

-- Finally, there is unlikely to be any moral hazard/free rider problem of rich people being able to rely on Government support others to maintain their relatively high living standards if they fail to save enough to provide for it themselves.

C.   The Role of Private Transfers

A general criticism that is often made of the efficiency of private market outcomes is the difficulty of maximising utility when individuals have inter-dependent utility functions, i.e. individuals may derive utility not only from their own welfare, but from the welfare of others. For example, people may derive disutility from the knowledge that some old people are experiencing poverty.

The main private mechanism for dealing with this is charity. To the extent that the benefits to the individual provider of private charity derive from having improved the welfare of somebody whose welfare the provider values, charity has important externalities. Non-contributing individuals who value the welfare of the charity recipient also benefit, and can free-ride on the charity provided by others. In this situation, private charity may be under-provided compared to a situation where each individual knew that all would contribute their fair share.

However, the public good element of private support for the elderly is greatly reduced by the institution of the family, where the welfare of fellow family members is weighted significantly higher than that of non-family members. In this case most of the benefits of private support are captured privately. Historically, the main source of consumption-support in old age has been the extended family. People invested in their children as security in old age, as is still the case in many developing countries. In primarily rural societies, the family farm permitted the individual to reduce his/her work effort gradually as younger family members took over the workload. Average family size was larger -- which meant a lower "cost" per child in supporting aged parents -- and life expectancy lower.

The emergence of modern industrial society has seen a number of developments detrimental to the economic position of the elderly. Older workers are less able to gradually wind down their workforce participation and many must retire completely. Urbanisation has seen a large fall in family size and a weakening of family ties. And life expectancy has increased

significantly. For example in Britain in the 19th century many of the elderly either worked until they died or ended in the poor house. In the 1890s it was estimated that 40 per cent of the population over 65 were receiving public relief on the grounds of destitution and that in the last years of life the proportion rose to 50 per cent. Broadly similar situations apparently existed in other western countries before public pension schemes were introduced, which suggests that, for whatever reason, family support for the elderly was inadequate (as was private self-provision for old age). Population historians have shown that the three-generation family living under one roof has not been a feature of British society at least back to the 16th century.

In considering an appropriate role for Government arising from the difficulty of private market mechanisms in dealing with interdependent utility functions, it must be recognised that Government's similarly face serious difficulties in preference revelation. What is the appropriate level of public support? For whom? Funded by whom? How effective is the political process as a means of deciding these questions? These issues of "Government failure" are examined in the next Chapter.

IV. CONCERNS WITH GOVERNMENT INTERVENTION

The conclusion, based on both theoretical considerations and empirical evidence, that private arrangements will not guarantee adequate old age income for all individuals, provides a prima facie case for Government intervention, if equity concerns (or poverty prevention) rank among the Government's objectives. In addition it' is also conceivable that some of the efficiency concerns with private provision may be successfully addressed by carefully designed Government intervention.

To identify short-comings resulting from private provision of old age income is, however, not sufficient to justify Government intervention. There are two major reasons for this: firstly Government intervention into the provision of old age income itself gives rise to inefficiencies by creating distortions in relative prices resulting in dead weight loss. Secondly, as individuals face obstacles in realising their objectives in private markets, so the Government faces obstacles in achieving social objectives through the formulation and implementation of Government policies. These concerns with Government intervention are analysed in more detail in the following two sections of the paper.

A. Disincentive Effects on Personal Saving and Labour Supply

How Government intervention into old age income provision will affect individuals' labour supply and saving depends on both the type of intervention chosen and the individuals' behaviour or "tastes" (characterised by the parameters of their utility functions).

The life cycle model of saving (LCMS), the basic implications of which were outlined in part I of this paper, can also be used to analyse the effects of various types of Government intervention on individuals' behaviour. Apart from the individuals' tastes, these effects will depend on both the expenditure aspects of the intervention and how the revenue to finance them is raised.

In its most general form the LCMS provides, however, only rather limited guidance to policy design because of the indeterminancy of the theoretical effect of most policy action on household behaviour. To get unambiguous household responses, a priori constraints have to be imposed on the general model. The following analysis is based on three basic assumptions:

- Household saving will increase if the real effective interest rate increases (i e the interest elasticity of saving is positive),

- The real wage elasticity of labour supply is positive; (e.g. the supply of average hours worked will increase if the real wage increases);

- Consumption and leisure are "normal" goods in all periods of the individual's life cycle;

-- Changes in Government saving do influence national saving; (i.e. the Barro-Ricardo equivalence theorem holds only partially at best).

It is not excluded that these assumptions may be violated for a single individual, but they are assumed to hold in the aggregate, i.e. for the majority of individuals. Thus statements about likely behaviour do not imply that ALL individuals necessarily behave in this way, but refer to the REPRESENTATIVE individual. Empirical evidence suggests that these a priori restrictions on the general model are reasonable.

The discussion that follows will not go into detailed analysis concerning specific instruments of Government intervention into the provision of old age income. Rather it will discuss the principal aspects of such intervention, i.e. the payment of transfers to the elderly and the taxation of income earners to finance these transfers, and how individual decision making is likely to be affected by such intervention. A more detailed discussion of the effects of specific interventions and their mode of implementation will be presented in Part V B. of the paper.

It is convenient for analytical purposes to first assume that all Government expenditure on behalf of old age income provision is financed by a lump sum tax This makes it possible to isolate the income effects of the intervention. This unrealistic assumption will be relaxed subsequently, when it is assumed that revenue is raised through an income (rather than an expenditure or payroll) tax, affecting both the after tax rate of return on saving and the real wage. Also, for analytical convenience, the saving-consumption and work-leisure decisions are analysed separately, though in practice they will of course be made simultaneously. Diagrams illustrating the arguments presented below are attached in Annex A.

Starting with the consumption-saving decision (and assuming earned income to be constant), Government old age income transfers will shift the individual's life time budget constraint outward, while the imposition of (lump sum) taxes to finance this expenditure will shift the budget constraint inward. The net effect of these two flows on a given individual's budget constraint depends on whether the scheme is actuarially fair or not. If it is, the present value of the (expected) benefits received in old age and the taxes paid during working life are equal, and the budget constraint will be unchanged. Therefore the individuals' life time consumption stream will not be affected, except in the case where they were planning a retirement consumption level below the level of the Government transfer: in that case the individual will be forced to consume more in retirement and less during his working life than originally planned. This coercion will cause a loss in welfare, -- a (side) effect of the Government's (or society's) decision to provide a minimum old age income (8). The only way for the individual to offset the implied reduction in current consumption is to increase his/her earned income (i.e. his/her labour supply)

Even if the individual's budget constraint and his lifetime consumption stream are unchanged, the intervention will change his/her saving ratio as conventionally measured. During the working period of the individual's life cycle the tax imposed will reduce disposable income, and with consumption remaining constant saving will decline. In effect part of private saving for retirement will be replaced by the Government's tax transfer scheme. Obviously the higher the level of the Government transfer (and therefore the tax imposed), the larger will be the reduction in saving as conventionally

measured. In the limit, if the transfer reaches a level matching the old age consumption stream originally planned by the individual, his/her saving for old age will decline to zero (9). On the other hand disposable income in retirement will go up (by the amount of the transfer), and -- with consumption remaining constant, the saving ratio will increase (i.e. become less negative) for individuals pertaining to this age group.

Most Government interventions into old age income provision imply considerable income redistribution between individuals. Indeed, to the extent that the scheme is mainly motivated by equity concerns, this will be its major objective. This implies that the old-age-related tax-transfer scheme is not actuarially neutral for most individuals: the present value of expected benefits will exceed (fall short of) the present value of related taxes for recipients of low (high) taxable life time income.

As a result the life time consumption stream will increase (decrease) for individuals receiving a positive (negative) net benefit. Saving of individuals in working age will be reduced for all individuals, but relatively more for individuals receiving a positive net benefit. As before, however, the scheme will reduce personal dissaving during old age due to the increase in disposable income (the old age benefit).

Since the scheme affects individual saving and saving ratios during working age and in old age (after retirement) in opposite directions, the net effect on aggregate personal saving cannot be predicted unambiguously. There is some presumption that the real resource cost of such a redistributive scheme will reduce disposable personal income and thus exert an overall negative effect on the LEVEL of aggregate personal saving, though not necessarily the saving RATIO of the household sector. Overall household saving is also likely to be negatively affected by the reduction in earned income in response to reduced labour supply, cf. below.

Whether and how NATIONAL saving will be affected by the scheme depends on whether the net change in personal saving is partly, fully, or more than fully offset by Government saving. This question is related to -- though not determined by -- whether the Government scheme is funded or not. The question cannot be answered without knowing the change in the general Government saving caused by the scheme. These questions are discussed in more detail in Annex B of this paper.

The effect on labour supply of an old age tax-transfer scheme financed by lump sum taxes will depend on whether life time disposable income is increased, decreased or left unchanged by the scheme, i.e. whether and how the budget constraint is shifted. A net increase (decrease) in life time income will reduce (augment) the life time labour supply, unless leisure is an inferior good. If life time income is unchanged, labour supply should also be unchanged, except for the case mentioned earlier where the scheme forces the individual to consume more in old age than he/she would have chosen without the scheme. In this case he/she may decide to increase labour supply in order to maintain the desired consumption level during working live.

Lump sum taxes are not feasible, and in practice tax revenue will have to be collected by taxes which introduce distortions. The next step is to consider the effects of financing the old age transfers from an income tax. In this case the budget constraint relevant for the work-leisure choice will be rotated, since the income tax drives a wedge between the the real after tax

wage and the marginal product of labour. The budget constraint relevant for the present consumption-saving decision will be both shifted inward (due to reduced labour income) and rotated since the income tax also drives a wedge between the after tax real rate of return on saving and the marginal product of capital. These factor price changes induced by the income tax will have both income and substitution effects.

The income effect of the tax induced changes in factor returns can be analysed in the same way which was applied in the case of lump sum taxation. The substitution effect from the reduction in after tax interest rates will entail a reduction in personal saving, while the reduction in the after tax real wage will entail a reduction in labour supply. The various income and substitution effects on personal saving and labour supply are tabulated in table 2.

(Table 2. Incentive Effects of Government Intervention)

In principle an individual's life time labour supply can be varied by different decisions affecting average hours worked (per day or per year), choice of retirement age, or the participation decision (10). On theoretical grounds any labour supply decision should probably be expected to affect all these dimensions of labour supply simultaneously. In practice some of these labour supply dimensions are more subject to regulation (private or public) than others, though in the long run the regulation itself can be expected to be shaped by prevailing work-leisure preferences and how they are affected by Government old age tax-transfer schemes.

It would exceed the scope of this paper to try to identify quantitatively which dimension of labour supply will be affected by the intervention of Government into old age income provision. Empirical research suggests that the net effect differs significantly between different subgroups of the labour force and with respect to the various dimensions of labour supply: average hours worked, retirement age and labour force participation decisions are affected differently for heads of family than for "secondary" labour force participants whose wage and income elasticities are generally larger.

Efficiency concerns with Government intervention in old age income provision are usually expressed with respect to induced reductions in personal saving and labour supply. From an individual welfare point of view, however, it does not matter whether the Government intervention leads to an increase or a decrease in personal saving and labour supply relative to the undistorted optimum. Dead weight losses (i.e. reductions in welfare) will occur in either case.

Government intervention into old age income provision need not be restricted to tax-transfer schemes or similar arrangements. Additional (or alternative) measures may involve changing individual behaviour through regulation (e.g. compulsory private saving for old age). As in the case of tax-transfer schemes this may also involve dead weight losses to the extent that it forces individuals to move away from their preferred consumption-saving pattern over the life cycle.

B.   Public Choice Issues

Public Choice theory can be defined as the economic study of non-market

decision-making (or the application of economic analysis to the study of politics). The basic tenet of Public Choice theory is that voters, politicians and bureaucrats act mainly out of self-interest. This approach to political science, which has essentially emerged only over the last 30 years, differs from that traditionally taken by economists and political scientists, who tended to assume voters, politicians and bureaucrats were motivated by a desire to promote the public interest. The assumption of self-interest has enabled the use of economic methodology to analyse the behaviour of voters and politicians. In highly stylised form, some of the positive conclusions arrived at by Public Choice theorists are:

-- Voters; because the effect of a person's vote on their well-being is so small, and informing oneself about the issues has costs, rational voters will not bother to be very well informed about the issues on which they vote (empirical studies show voters to be extremely ignorant); nor will they exert themselves to any great extent to vote (witness the effect of bad weather on polling turn-outs). A further result is single-issue voting, which may be an efficient rule-of-thumb given bounded rationality and information costs. Some writers assert voters suffer from "fiscal illusion". By this they mean that the costs of general-tax financed programmes are non-transparent, while the benefits are more apparent. Voters may mistakenly vote for expanded benefits because the costs to them are hidden in their total tax bill;

-- Politicians; politicians are persons whose objective is to be elected by (ill-informed) voters. There are reasons to believe that they too will be relatively ill-informed. An individual Member of Parliament who at the margin substitutes campaign work for general study of the issues on which he/she must vote is unlikely to significantly reduce the quality of legislation as it affects his/her constituency, but may well improve his/her chances of re-election. More generally, because of agency problems, to a significant extent politicians' behaviour is not necessarily that which maximises the public welfare;

-- The Voting Process; electoral procedures do not introduce enough competition between suppliers (parties) to result in consumer sovereignty. The "market" is highly concentrated -- in many countries politics are dominated by two or three major parties. The "all or nothing" nature of elections, their cost and infrequency, mean that for much of the time voters have only limited control over politicians, and are seldom able in any meaningful way to express their preferences on any one issue by voting. Interest groups with a strong preference for specific Government actions may obtain them outside the electoral process by lobbying and appealing to the self-interest of politicians. It has in fact been shown there are serious difficulties in identifying a collective decision-making process that will reflect individual voter preferences;

-- Bureaucrats; their control by politicians is attenuated by the fact that the former are generally unable to dismiss, or reward with promotion, the bureaucrats in Government Departments. The difficulty of specifying Departmental objectives, and of measuring an individual bureaucrat's contribution to their achievement, exacerbates this problem.

In this situation, bureaucrats have scope to pursue their private motives -- for example, shirking, pursuing perks, expanding the size of their Department, and pursuing their own ideological and/or economic objectives.

Public Choice theorists have drawn a number of normative conclusions from the above positive analysis. Tullock (1986) has described the constancies of opinion as including the following:

-- Voters should vote more often than at present, and there should be more direct voting on issues. While voters are not well-informed, they are the only actors in the political process who do not have an element of systematic bias;

-- More than a simple majority is desirable for most legislation to reach an optimal decision;

-- At the level of the bureaucracy, greater accountability to politicians, more competition between Departments, and contracting out or privatising activities are desirable.

With specific reference to social insurance programmes, Browning (1973) has developed a majority voting model to analyse the determination of taxes and transfers in a pay-as-you-go (PAYG) social insurance scheme (based on a fixed percentage payroll-tax). He assumes a society in which all individuals face three distinct, equally long life cycle periods -- youth, middle age and old age Every eligible voter works in his/her youth and middle age, while in old age he/she is retired. For moderate rates of population growth, the middle aged and old will outnumber the young. Browning considers how would such a society decide on the common level of contribution or tax per worker when considering the introduction of a PAYG social insurance scheme, under a majority voting rule.

The young workers would prefer a tax rate that balances their preference between present and future consumption over their lives. The retired workers would prefer a higher tax rate (perhaps as high as 100 per cent, disregarding inter-dependent utility functions and disincentive effects), since this maximises their benefits and they bear none of the direct costs. The position of the middle aged workers is crucial. They will be paying the tax for only part of their working lives, will receive a higher rate of return than young workers, and will therefore be likely to favour a higher tax rate. Because theirs is the median position, the tax rate they favour will prevail under a majority voting system. This tax rate will persist over time because each new cohort of middle aged would oppose a reduction to the level they favoured when they were younger i.e. they treat past contributions as "sunk costs".

Under majority voting therefore, the introduction of a PAYG scheme (or an increase in the rate), benefits the middle aged and retired, at the expense of the young, and all future generations. From the point of view of any generation, the optimal tax rate is the one they favour when they are young workers. The redistribution from future generations to the present middle aged and retired that results under majority voting on the introduction of a PAYG scheme, or an increase in the tax rate, can only be justified on equity grounds if we assume subsequent generations will be wealthier and the unborn would favour such a redistribution.

Browning has also argued there is little likelihood a PAYG scheme will ever be either terminated or transformed into a fully funded scheme. This is because the current voters are the most likely losers, while the winners are the young and the unborn.

Kurz and Avrin contend that, while the introduction of a PAYG scheme may have reduced the capital stock, from then on a PAYG scheme is pareto efficient (i.e. no-one can be made better off without making someone else worse off). In that sense the question of funding is primarily an issue of inter-generational equity rather than of efficiency.

Veall (1986) takes the analysis further and views any funded scheme as being vulnerable to a future working generation deciding not to contribute, not having had to pay for its preceding generation's retirement, but relying on the succeeding generation to support it.

There are several difficulties with Browning's analysis. Voters do not have the opportunity to vote only for or against a social insurance programme, but are faced with voting at an election on the basis of a party platform covering a wide range of issues. (Opinion polling however may improve preference revelation on individual issues.) Browning's model also does not explain why tax rates are not more frequently raised by successive generations of middle-aged and elderly voters, and how benefit reductions occur. Nevertheless, the model has some appeal. Single-issue voting by the elderly and older middle-aged at general elections might be expected on a matter such as social insurance, where the benefits to them are significant, transparent, and more or less immediate. The lower time-cost to the retired of lobbying may give them an advantage in gaining politician's attention.

This brief survey of Public Choice theory brings out the following:

-- While inter-dependent utility functions present difficulties for private market mechanisms, collective choice processes similarly face problems with preference revelation. In Western Democracies the infrequency of elections, their all or nothing nature, and the concentration of the political marketplace mean that voters are seldom able in any meaningful way to express their preferences on any one issue, such as the desirable level of public support for the aged and the overall regime of old age income maintenance;

-- The limited accountability of politicians and bureaucrats gives them scope to pursue (perhaps unwittingly) their own interest at the expense of the preferences of the electorate. Politicians may place undue weight on short-term fiscal saving, or short-term electoral considerations, at the expense of implementing sound longer-term policies. Bureaucrats may recommend policies that cater to their own preferences. To the extent they receive higher incomes than the community average, they are likely to be more risk-averse, and have a lower rate of time preference, than the average voter. In the retirement saving area, this may bias them in favour of compulsory schemes.

-- There may be a tendency in a democracy for majority rule to result in a PAYG Social Insurance scheme with contribution rates in excess of the rate that would be preferred by any given generation over their lifetime. In a situation where the dependency ratio is set to rise

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significantly over time, reductions in public support for the elderly may become increasingly difficult to achieve through the democratic process.

These conclusions suggest it is desirable to explore improvements to the collective decision-making process with respect to old age income support. Such improvements might include attempts to achieve more effective representation of voter preferences over some of the major policy parameters, together with transparency and entrenchment mechanisms to reduce the exposure of policy to the hazards of short term political or bureaucratic opportunism (e.g. enhancing the role of the private sector, specifically ear-marking taxes, ensuring transparency of redistributive effects, and requiring greater than simple majority voting to effect policy changes). To the extent however that Browning's median voter analysis has some validity, improving voter preference revelation should perhaps be limited to non-binding forms.

VI. PRINCIPLES OF OPTIMAL INTERVENTION

Given the shortcoming of exclusive private provision of old age income and the possible distortions introduced by Government intervention, what is the optimal policy approach in this area? This Part of the paper attempts to provide relevant information and analysis required to provide an answer to this question Section A deals with a number of general issues which are equally relevant for all alternative policy approaches. Section B presents several basic alternative approaches to Government intervention in old age income provision, and evaluates them on the basis of a common list of criteria.

All schemes considered are based on the assumption that the optimal approach to the issue of old age income support will require an important role for both private sector institutions and the Government. The objective of the Government in this context is to prevent the occurrence of material poverty in old age, with a minimum loss of efficiency in the allocation of resources in production and consumption, both in a static and a dynamic framework. To secure this objective in the long run, the Government must also aim at a scheme which is fiscally sustainable and which is considered fair by the great majority of voters/participants. Only under these conditions can the proposed scheme be expected to be sufficiently permanent to permit individuals to base their life cycle planning on it

The comparative evaluation does not conclude with a firm recommendation of any single option. The reason for this is threefold:

-- The final choice will to a considerable extent depend on value judgements concerning competing objectives, in particular -- but not exclusively -- the trade-off between equity concerns and efficiency objectives;

-- There remains considerable uncertainty about the actual efficiency losses likely to be inflicted by distortions resulting from specific Government interventions. The final choice will thus depend on the assumptions made (or -- better yet -- the additional empirical evidence obtained) concerning the empirical significance of the incentive effects discussed in qualitative terms in this paper;

-- Many detailed questions concerning for example, specific contribution and benefit levels in the alternatives discussed need to be decided, and it is possible that the final choice is not independent of at least some of these detailed decisions;

-- Many of the distinguishing characteristics can be combined to form hybrid schemes, -- in fact the final choice is likely to consist of some optimal mix of the various "pure" options considered here.

This paper should therefore be seen as an initial general overview of the existing problems and tradeoffs in designing a Government pension scheme, and the basic alternative approaches to address these issues

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A.   General issues

Many issues arising in the context of old age income support policies are common to most or all feasible alternatives and will be discussed in this section

i) Individual vs. family as unit of assessment

A decision has to be taken whether to make the individual or the family the basic unit of assessment in the organisation of old age income support. Given the coexistence of both isolated individuals and integrated households, neither alternative will be wholly satisfactory in all circumstances. The possibility of individuals living together without forming a "household" in the traditional sense of the nuclear family further complicates the situation.

In the comparison of alternative schemes presented below we make the individual the basic unit of assessment in old age income support schemes. This seems to be the preferable option in the light of prevailing sociological trends. This approach can be modified if desired through the use of "living together" clauses, as is currently the case in various countries.

ii) Demographic influences

A major reason why the current systems of old age pensions in many Member countries are considered unsustainable is the projected increase in the proportion of the population over sixty years of age: on current projections, this proportion will gradually rise from around 15 per cent in 1990 to a peak of well above 25 per cent in most Member countries over the next five decades (11).

In evaluating the effect of these demographic factors on the sustainability of existing old age pension schemes, the following considerations have to be taken into account:

-- Projections of fertility rates are very speculative, and significant deviations of birth rates from the assumed values underlying the projections may change the latter significantly;

-- The increase in the proportion of old people is to some extent offset by a decline in the proportion of persons under fifteen, so that the increase in the overall dependency ratio (including both young and old) is less drastic than the proportion of the aged alone. The resulting reduced expenditure on young people should to some extent offset the increasing requirements for financing old age income support (12);

-- Within the old age group, the increase in the proportion of people over 75 is even more pronounced than that of the group in general; given the increase in claims on institutional care and medical services with increasing age, significant claims on resources (and public expenditure) should be expected apart from financing regular old age income support (13);

-- For all countries the demographic projections referred to above are based on "normal" migration patterns. An active immigration policy

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could in principle reduce or completely offset the projected increase in the proportion of old people.

While an immigration scheme on a scale sufficient to stabilize the proportion of over 60 year olds at its present level appears too massive to be likely to be implemented in any country, a more positive approach to immigration should be considered as an important element in any policy mix aiming to reduce the strain of financing old age income support.

Further relief may be gained by reconsidering the eligibility age for old age income support. It appears that the current system prevailing in most Member countries of a fixed year of eligibility with no regard for the individual's past working life history, can be improved upon. To offer retirement at an identical age (e.g. sixty-five years) to both a blue collar worker who joined the labour force at the age of fifteen and a highly trained professional who left university at the age of twenty-five seems inappropriate. One possible option would be to set the eligibility age at sixty-five years or forty years in the labour force, whichever occurs first. Other options are of course feasible, in particular to let people choose their retirement age, with an actuarially neutral adjustment of the pension paid.

iii) Inflation and nominal income taxation

A serious impediment to the satisfactory private provision of old age income by those with sufficient life time earnings is the inflation risk. In principle anticipated inflation should not create any problem since it will be reflected in higher nominal interest rates and rising prices of real assets, protecting net lenders and investors from inflation-induced capital losses. And the introduction of indexed Government bonds can in principle allow investors to eliminate the risk of unexpected inflation.

These mechanisms, however, will fail to protect the investor in interest earning assets as long as income taxes are levied on nominal rather than real interest earnings. Given that the inflation premium in the nominal interest rate is a compensation for the decline in real value of the principal rather than a real interest return, taxing the inflation premium amounts to levying a wealth tax. As a consequence, the higher the inflation rate the more likely it is that the real after tax rate of return will be negative, and the real value of saving for old age will be eroded.

This implies that the abolition of taxes on the inflation component of nominal interest income, in combination with the availability of indexed bonds, would greatly enhance the ability of individuals to provide for their old age income, and as long as this is not the case, the case for a comprehensive public old age income support scheme will be strengthened.

iv) Earnings related old age income support

There is widespread agreement that society has a collective obligation to prevent deprivation among the elderly (as indeed of any member of the community). There is much less agreement on the income level at which such a Government "safety net" should be established, and on detailed questions of how it should be implemented. In particular with respect to old age income support the question is frequently raised whether the benefits paid by a public scheme should be related to the level of income earned during the individual's working life. In fact old age pension schemes in many OECD countries display this

feature which may be objected to for the following reasons:

-- It perpetuates income differentials experienced during working life. While such differentials are likely to persist through the use of private saving schemes, there is little justification for the Government to enforce such a system;

-- Such a scheme is likely to entail at any point of time "adverse" income re-distribution from the working poor to the retired rich;

-- Old age and retirement are events which can be predicted with certainty, and thus the arguments justifying earnings related income support used in the context of other Government income support schemes (e.g. unemployment insurance) are not applicable here;

-- It increases the degree of Government intervention and thus the risk of forcing a suboptimal distribution of life time consumption on individuals capable of taking care of themselves.

A compulsory earnings related old age income support scheme can, however, be justified on the ground that private market mechanisms are plagued by inefficiencies (cf. Part III above) which prevent individuals from realising their optimal retirement income level through private saving. But this argument has to be weighed against the counter-arguments also evoked above before implementing an earnings-related old age income support scheme.

While a compulsory post-retirement earnings maintenance scheme may thus be rejected on both equity and efficiency grounds, it may be worthwhile to consider the possibility of voluntary supplementary retirement saving by individuals with an existing Government scheme to take advantage of possible economies of scale. Public pension schemes in some OECD countries (e.g. Germany) already provide the option of voluntary supplementary retirement saving on an actuarially fair basis in competition with private sector schemes.

v) Subsidisation of retirement saving

A frequent element in governments' old age income support policy is the subsidisation of private saving, either directly or through tax concessions; this instrument is still widely used in virtually all OECD countries with the notable exception of New Zealand.

There are strong reasons to reject the use of such an instrument on both equity and efficiency grounds:

-- The benefits of such a scheme (as of any saving subsidy) accrue mainly to individuals with the greatest saving capacity, i.e. high income earners, making it inequitable;

-- To the extent that individual pension contributions eligible for tax subsidies are subject to a ceiling which is lower than total saving by the individual, the scheme has no effect on the marginal rate of return on saving and thus does not provide a relative price (or interest rate) incentive for additional saving, only an incentive to shift saving to the subsidised instrument;

-- Saving subsidies (or tax concessions) transfer substantial amounts of income from the public to the private sector. If the marginal propensity to consume in the private sector exceeds that of the public sector, these income transfers may actually lower the national saving ratio rather than increasing it.

Tax concessions are sometimes avocated as being justified to offset the savings disincentive where the State operates a system of income tested pensions, such as in Australia (i.e. a social welfare only system). However, the saving disincentive is faced mainly by low and middle income groups, who can decide not to saving during their working lives in order to qualify for a Government pension. High income earners are not likely to fall within the target group Yet it is members of higher income groups who capture most of the benefits of saving subsidies.

In addition, tax concessions are sometimes advocated as a means of reducing the State's future liability to provide income support to the elderly, by helping people to save enough for their own old age. However, this argument does obviously not apply where the State operates a universal, (or near-universal) pension scheme. Tax concessions for private saving in this situation do nothing (or very little) to reduce future State spending. And where the State operates only an income-tested pension scheme, tax concessions can cost the State more than a life pension (14).

Tax concessions are also sometimes advocated as a general means of offsetting the saving disincentive imposed by an income tax system. However, tax concessions for saving must be financed by raising taxes elsewhere by an equivalent amount, including general income taxes. Secondly, all taxes (except lump sum taxes) introduce relative price distortions. An income tax distorts both the labour/leisure decision and the consumption/savings decision, while a consumption tax distorts the labour/leisure decisions alone. Which is less distortionary, and where the balance should lie between income and consumption taxes, is a major issue in tax policy design. The decision should be global one however. If the conclusion is reached that there is too great a reliance on income taxes, the answer is to shift the balance rather than subsidise saving.

vi) Transparency

Any Government intervention into old age income provision will have important repercussions on various aspects of income distribution:

-- The distribution of an individual's disposable income over his/her life time;

-- The distribution of income within a given age cohort;

-- The distribution of income between different generations.

Rational discussion of alternative Government interventions requires that these various redistribution effects are made explicit and transparent. It is therefore important that the implementation of whatever old age income support option is adopted permits the participating individual (and thus the electorate in general) to understand the resulting distributive effects. This includes the arrangements adopted to finance the expenditure of the scheme chosen, which may have important repercussions for the national saving ratio.

The need for transparency conforms with the thrust of the ongoing reforms in the public sector in many Member countries, and questions related to these issues are discussed in more detail in Annex B.

Related to the requirement of transparency are the issues of sustainability and credibility of the chosen policy towards old age income support. Failure to convince the public that the scheme adopted is financially sound in the long run and politically robust (in the sense of not being likely to be subject to massive revision in the event of a change in Government) may cause uncertainty, insecurity and considerable welfare losses. A broad political consensus is thus desirable for the scheme eventually adopted, and an effort should be made to entrench the scheme to make it less vulnerable to attempts of future alteration.

vii) The transition

The long-term character of the implicit and explicit contracts involved in private and public old age income provision requires that any modifications made to the current system should be introduced gradually so as not to violate rightful claims accrued in the past. Fortunately the current situation is favourable to a phased introduction of change: in most Member countries the deterioration in the age composition of the population referred to above is unlikely to start in earnest before the beginning of the next century, giving ample lead time for necessary changes. On the other hand the current fiscal situation in many countries is such that wherever fiscal savings are feasible in the process of desirable reforms they should not be delayed.

B. Evaluation of Alternative Interventions

This section presents and evaluates the basic options available to the Government in attempting to redress the short-comings identified with purely private provision of old age income. The comparative evaluation takes account of both the concerns with private provision as well as those concerns and effects to which the intervention itself gives rise.

The first scheme (scheme I) is a means-tested old age benefit, paid to each qualifying individual at a flat rate (modified by appropriate equivalence scales if desired) and financed from general tax revenue. This scheme thus is more akin to a tax financed need based welfare system rather than a conventional public old age pension system. It is the type of scheme presently found in Australia.

The second scheme (scheme II) is identical to the first, except that the targeting is dropped. That is, it is flat rate benefit for all individuals above qualifying age, financed out of general taxation. It is a stylised version of the public pension scheme operative in New Zealand, before the latter's modification by the superannuation surcharge in 1984.

The third scheme (scheme III) is an old age saving scheme, to which income tax payers are required to contribute a fixed percentage of his taxable income, and which is administered as an autonomous public old age pension fund. Three alternative options of this scheme can be considered, differing in the ways benefits are paid and contributions are levied:

Individuals not in the paid labour force will normally be unable to make contributions to the fund, and low income people may be unable to make

sufficient contributions to finance adequate future old age pensions. Therefore the first financing alternative (scheme III-A) is one where an aggregate transfer from the general budget to the autonomous public pension fund supplements the contributions of individuals on low or zero incomes, at a level sufficient to finance their future minimum old age pensions. Pension paid by the fund will be actuarially fair for contributors whose previous contributions permit a pension equal to or exceeding the minimum.

The second alternative (scheme III-B) is a two tier scheme which combines an actuarially fair compulsory old age pension fund for all income tax payers with a targeted old age benefit scheme (as scheme I) for individuals who have been unable to make sufficient contributions during their working lives. The targeted tier will make sure that the actuarially fair pensions provided by the compulsory fund will be topped up to reach the minimum pension in all cases. The second tier will be financed from general government revenue.

Both schemes III-A and III-B entail an explicit separation of the transfer and the saving functions of old age income provision. They differ in that the redistributive component of scheme A is financed on an accrual basis (i.e. as pension rights accumulate) and as an aggregate contribution to the pension fund, while the redistributive component of scheme III-B is financed on a cash basis (i.e. when pensions have to be paid out) and paid to the individual benefit recipient.

The third financing alternative (scheme III-C) does not separate the welfare and annuity functions. It requires contributions from all individuals in relation to their (taxable) income (at proportional or progressive rates), so as to fully finance the pension claims accrued in each period. Benefits paid out are at a flat rate, i.e. not related to the contributions made during working age. This scheme is similar to scheme II, except that its accounting is separate from the core Government budget and contributions are levied as pension claims accrue rather than when pensions are paid.

The fourth scheme considered (scheme IV) is similar to the third scheme, except that individuals' compulsory contributions are to be made to (approved) private competitive superannuation funds rather than an autonomous public fund. In this case benefits will be actuarially fair, subject to the performance of the private fund.

There are again two alternative financing versions of this scheme: The first (scheme IV-A) in which contributions for individuals unable to pay (because of zero or low incomes) are paid by the Government to a private fund (of the individual's choice) from general revenue, and a two tier scheme (scheme IV-B) in which old age income of individuals who have been unable to make adequate private contributions during their working age are provided fully or partly by a targeted welfare scheme organised along the lines of scheme I.

The difference between the two options of scheme IV is that option IV-A finances the redistributive component of the scheme on an accrual basis, while option IV-B finances it on a cash basis, i.e. the same difference as observed between schemes III-A and III-B.

These stylised alternative approaches to Government intervention into old age income provision elaborated above can be evaluated with respect to a number of relevant criteria. These include how the schemes deal with concerns arising from purely private provision, and with concerns they may give rise to

themselves. The latter include equity and efficiency concerns, various administrative concerns, issues of transparency, of social norms, and the question of ease of transition from the existing method of old age income support to the alternative option considered. The results of this comparative evaluation are summarised in Table 3, while a more detailed discussion is presented in the following paragraphs.

(Table 3. Evaluation of alternative interventions)

a) Concerns arising from purely private provision of old age income

The first set of evaluation criteria (group a in Table 3) looks at how the different options cope with the problems arising under purely private provision. All options meet the basic equity concern about old age poverty by providing a floor to old age income. At what level this floor is set cannot be decided through positive economic analysis but requires a (collective) value judgement. For the purpose of the current comparison it is assumed that the benefit is set at an identical level (e.g. a given proportion of overall average income) for schemes I, II and III-C, while it is earnings related (on an actuarial fair basis) under schemes III A and B as well as IV A and B. Schemes and options relying heavily on targeting (e.g. I, III-B, IV A and B) entail nevertheless a certain risk of old age poverty due to non-take-up of benefits in response to the perceived stigma attached to receiving welfare payments or the disutility of means testing procedures.

The performance of the various schemes with respect to the other equity concern -- functional discrimination (according to race and sex for example) in the determination of financing contributions -- will depend on the detailed implementation of each scheme. Whether such functional discrimination is desirable or not requires itself a value judgement, the decision on which will have implications for the (ex-ante) redistribution of income between different risk groups (e.g. males and females, who have different life expectancies). In any case, such functional discrimination is not possible under schemes I and II; it is feasible (i.e. discretionary) under scheme III for the compulsory contribution component of the scheme, and it is indeed likely to occur for that component under scheme IV, to the extent that such risk classification is efficient.

Turning to the efficiency concerns arising from purely private provision, all options address problems arising from bounded rationality to the extent that they overlap with the equity concern. E.g. where myopia would result in old age poverty, all options would prevent this from happening, but where it entails only a drastic fall in old age income of previously rich people (without forcing them below the old age income floor) this will only be corrected under schemes with earnings related benefits, e.g. III A and B as well as IV A and B for the reasons detailed in section A.iv. above. On the other hand the schemes with earnings related benefits run a higher risk of forcing individuals into undesired consumption-saving patterns over their life time than the flat benefit schemes.

The inflation risk will similarly be eliminated only to the extent that it overlaps with the equity concern through indexation of the old age income floor under schemes I, II, and III, which means that the risk is borne by the Government. Under scheme IV it is expected that private superannuation funds respond to the inflation risk by appropriate diversification and hedging of their portfolios; but there will be a residual risk due to the interaction

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between inflation and the nominal income tax scheme which the Government may have to bear under scheme IV.

b) Efficiency concerns caused by intervention

A major inefficiency caused by Government intervention is due to the relative price distortions created by the imposition of taxes. There are two principal aspects to the distortions created by taxes: the level and the dispersion of the (marginal) rates at which they are levied. All schemes discussed rely on personal income levies to finance Government support to the provision of old age income. In the case of schemes III A and B, and IV A and B, however, the guaranteed old age income of the bulk of individuals is provided from compulsory old age pension schemes (either public or private), actuarially fair contributions to which are considered separately. The remaining income tax burden to finance public support for old age income to individuals who cannot cover the contributions to the compulsory fund are thus low on average. They are also low on average for scheme I due to comprehensive targeting. Only schemes II and III-C thus display a relatively large income tax burden on average.

The exclusion of obligatory contributions to the compulsory old age pension fund from the computation of effective tax rates is controversial. It can probably be justified under the schemes where contributions lead to an actuarially fair pension, i.e. schemes III A and B, and IV A and B; it seems, however, unjustified in the case of scheme III-C.

The dispersion of effective marginal tax rates (EMTRs) caused by the various schemes will depend on the role of targeting in each scheme. Targeting implies that EMTRs will be higher for individuals receiving Government support than for other individuals. How much higher will depend on the speed of benefit abatement with respect to other income.

With respect to personal saving for old age, the dispersion of EMTRs will be high for schemes I, III-B, and IV-B, all of which have recourse to targeting of old age income support. Scheme IV-A also targets the support given, but on an accrual basis (i.e. based on income during pre-retirement) rather than based on old age income. Therefore no dispersion of effective tax rates on saving results from this intervention. Nor does it occur under schemes II and III A and C, since these schemes do not use any targeting devices at all.

With respect to labour supply, there is again no effective rate dispersion under schemes II and III A and C for the same reasons as before. For the other schemes, a distinction has to be made between labour supply before and after the threshold age of eligibility for old age income support. Effective rate dispersion for tax on pre-retirement labour supply will be larger for those schemes for which the targeting is based on pre-retirement income (i e. schemes financed on an accrual basis: IV-A). It will be large for post-retirement labour supply under schemes which base the targeting of support on post-retirement income: i.e. schemes I, III-B, and IV-B.

The pattern of EMTRs just described will determine the disincentive effects the various schemes exert on saving and labour supply. As in the case of effective marginal rates, there is a level and a dispersion effect: the higher the average level of EMTRs the larger the disincentive effect on average, and the greater the dispersion of the EMTRs (due to targeting or other

reasons), the more the disincentive effect will be concentrated on the subset of individuals subject to the targeting. The resulting disincentive effects on old age saving and labour supply under the various schemes at different stages of the life cycle are detailed in table 2 and discussed in more general terms in section IV.A. above.

Under means tested schemes individuals can influence whether they will receive old age income support by their saving and work decisions, creating a problem of "moral hazard" (15). This problem is closely related to the notion of dependency traps, i.e. situations in which high EMTRs (resulting from means testing) greatly reduce individuals' incentives to increase their earned income or personal saving in order to eliminate the need for Government support.

Moral hazard with respect to old age saving will be strongest under scheme I The absence of means testing does away with moral hazard under schemes II, and III A and C, while under scheme IV-A there is no moral hazard with respect to old age saving because means tested contributions are paid during the individual's working live (i.e. on an accrual basis) rather than during retirement age. Some moral hazard with respect to old age saving remains under schemes III-B and IV-B, but the group of people affected will be greatly reduced (relative to scheme I) due to the compulsory old age saving of all tax payers.

In the case of schemes II to IV it is not possible to separate the moral hazard with respect to old age saving from that with respect to labour supply, since part of the individual's earning is withheld in order to pay his/her future old age pension, either explicitly (under schemes III and IV) or implicitly (under scheme II).

Moral hazard with respect to labour supply refers to the possibility of people withdrawing from the labour force before and/or after reaching the eligibility age for old age income support -- in order to avoid paying Government levies for the old age pensions they receive. Since all schemes guarantee a minimum old age income, all of them create at least some moral hazard of individuals leaving the labour force altogether. It will be greatest under scheme IV-A, where Government subsidies to pension fund contributions are means tested on the basis of earnings during working life. How strong it will be for the remaining options under schemes III and IV will depend on whether individuals interpret their contributions to the compulsory saving schemes as a tax (thus increasing their EMTRs), or as forced personal saving which most of them might have undertaken anyway.

Moral hazard with respect to post-retirement labour supply will be present in those schemes under which old age income support is targeted on the basis of current income (i.e. schemes I, III-B and IV-B)

c) Equity concerns of public intervention

Government intervention with the objective to eliminate the incidence of old age poverty may have undesirable repercussions on the re-distribution of life time income between individuals.

Under scheme I, the moral hazard with respect to old age saving may lead to the subsidisation of higher income earners (who did not provide for their old age) by lower income tax payers of subsequent age cohorts.

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Under scheme II, variations in the relative size of age cohorts will entail inter-generational income redistribution favouring retired members of the large cohort at the expense of working members of the subsequent relatively small cohort (unless of course the latter decide to lower benefit levels).

Since there are systematic differences in life expectancy, there will be an ex-ante re-distribution of income from individuals with relatively low life expectancy (i.e. males) to those with relatively long life expectancy, unless actuarially fair contributions are calculated taking these differences in life expectancy into account.

Where compulsory schemes provide flat benefits (i.e. benefits unrelated to contributions) a re-distribution of income will occur between individuals with identical life time incomes depending on the time profile of their life time earnings, if annual income is taxed at progressive rates.

d) Administrative concerns

Apart from the general efficiency concerns just discussed, Government intervention into old age income provision also gives rise to administrative problems. Among these is the threat that democratic voting procedures will lead to an over-extension of old age benefit schemes due to the under-representation of future tax payers in the electorate at any given point of time (cf. section IV.B. above).

This risk is largest for a universal scheme financed on a pay-as-you-go (or cash) basis, i.e. scheme II. Strict targeting as under schemes I, III-B and IV-B should greatly reduce the risk by limiting the number of recipients of net old age income support. Finally, the use of accrual accounting characterising schemes III-A, III-C, and IV-A should, if strictly adhered to, similarly reduce this risk.

Another administrative concern is the flexibility of the schemes with respect to their ability to respond to individual needs and or preferences. The greatest flexibility can be expected from schemes IV-A and B, where private funds can compete for customers by offering different pension packages (subject to the constraint of providing a minimum old age pension). An autonomous but publicly administered old age pension fund (schemes III A to C) would be less flexible, while schemes I and II are likely to be the least flexible, due to their integration into the general budget.

Target efficiency measures a scheme's ability to channel Government support precisely to those individuals in need of it, relative to the total size of the programme. It is highest for those schemes which are subject to targeting, but if need evaluation is based on life time (rather than annual) income flows, target efficiency can be weakened by moral hazard. The evaluation of target efficiency under Schemes III and IV depends crucially on whether the compulsory saving scheme is considered part of the overall transfer scheme or not. If not, the compulsory saving schemes rate very high. If earmarked contributions to actuarially fair pension schemes are included in the programme, schemes III A and B, and IV A and B rate low on target efficiency, since the size of such compulsory pensions schemes with earning related benefits will be very large.

Comparing the financing costs for the alternative schemes, a distinction has to be made between financing costs out of general revenue, and benefits

paid out of the compulsory old age pension fund. Financing requirements out of general revenue are high under the universal scheme II, and low under scheme I due to targeting. They are also low under the various options of schemes III and IV which cover most benefits (all in the case of scheme III-C) out of the compulsory pension funds. Conversely there are no financing costs out of earmarked contributions under schemes I and II; these costs are high under the three options of scheme III, while under the two options of scheme IV benefits paid out of earmarked contributions are high but paid by private funds.

Administrative cost will depend on the number of individuals receiving benefits under a given scheme on the one hand and the use of targeting on the other; -- the entries in table 3 concerning this criterion are self-explanatory.

e) Transparency issues

Transparency is a precondition for rational decision making and can be greatly enhanced by appropriate accounting procedures. Ongoing public sector reforms in many Member countries put great emphasis on the transparency of Government activity and accounting procedures. The question of transparency in the context of Government intervention into old age income provision is discussed in more detail in Annex B of this paper.

Accrual accounting in the context of old age income provision means that future claims on old age pensions are recorded as they accrue, i.e. as the individual grows older and accumulates his contributions to the old age pension scheme. Schemes I and II fail this test; they are financed on a pay-as-you-go basis, and individual contributions are compounded with current tax revenue. Schemes III-A, III-C, and IV-A are on a complete accrual accounting basis, while schemes III-B and IV-B are on an accrual basis for the compulsory contributions, but not for the targeted old age benefit component which is financed out of current revenue (when payable, not when accruing).

The separation of old age income provision from the core Government budget also enhances the transparency of the forced saving and redistribution functions of Government involvement. This is achieved fully (i.e. on both the revenue and expenditure side) only under scheme III-C. For the schemes operating under accrual accounting (III-A and IV-A) it holds for both contributions and benefits of self financing individuals, but only for the benefits of net Government beneficiaries. For the two tier schemes III-B and IV-B it holds for the self financing (actuarially fair) annuity tier of the schemes, but not for the welfare tier covering individuals unable to contribute to the compulsory pension fund. No separation whatsoever is achieved under schemes I and II which are fully integrated with the core Government budget.

The evaluation with respect to the preceding two criteria implicitly also provides a classification for the following two evaluation criteria: the various options of both schemes III and IV rank high with respect to transparency of income redistribution enforced by the schemes. This important issue is discussed in more detail in Annex B of the paper. Transparency of enforced income redistribution is lowest for the universal scheme II. It is slightly higher for scheme I, but not much if redistribution is evaluated on a life time rather than an annual income basis.

Similarly the lack of separation of old age income provision from the budget covering core Government activities affects the credibility of the

scheme. Subjective (and probably objective) security of benefits will arguably be higher under a system of earmarked contributions to an autonomous fund than under a system fully integrated with the core budget.

f) Social norms

This set of evaluation criteria includes items that cannot easily be classified within the preceding groups. They are mainly based on political value judgements rather than criteria related more or less closely to questions of efficiency

The first of these issues refers to "dignity" and originates from the concern that individuals incur welfare losses when they are subjected to targeting procedures in order to obtain income support. Consequently such concerns are relevant with respect to all the schemes which use targeting i.e. schemes I, III-B, IV A and B.

The second concern is with the scope of Government involvement. This is undoubtedly largest in the case of scheme II, and moderate in the case of schemes I and IV A and B where Government direct involvement is reduced by strict targeting. How the level of Government involvement is judged with respect to the three options under scheme III depends on the interpretation given to the autonomous old age pension fund. If it is equated with the Government (as is plausible) Government involvement under scheme III is at a large scale, comparable to scheme II.

Finally the degree of compulsion is high under all the schemes which demand compulsory old age saving contributions, whether to a public or to a private pension fund. It is also high in the case of the universal scheme II, and is lowest in the case of scheme I where targeting keeps the scale of operation lower.

VI. CONCLUSIONS

As the share of old people in the total population increases, the question of how best to provide an adequate level of consumption for the elderly steadily gains in importance. This is a policy concern shared by virtually all OECD countries. Private mechanisms exist which allow individuals to forego consumption out of their current income during their working years and accumulate savings to finance their consumption in old age.

An important characteristic of the private provision of old age income is that it requires long term planning by the individual under conditions of uncertainty. Though private markets have developed a large number of mechanisms facilitating long term financial and risk management, it is often alleged that actual decisions by individuals fail to secure efficient outcomes. As a consequence, it is argued, individuals may end up with insufficient resources during old age, even though their income during working life would have been sufficient to accumulate the savings necessary for adequate consumption in retirement.

There are various reasons to doubt the ability of individuals to make utility-maximising choices between consumption now and in old age. The long time horizons involved, the elements of uncertainty, and the non-repetitive and irreversible nature of many decisions concerning old age income provision pose difficulties for the rules of thumb which people frequently adopt in decision making under uncertainty.

Finally private markets have difficulties in dealing efficiently with inflation. This is mainly due to the interaction between the nominal income tax system and inflation rather than to inflation per se, and it is one of the reasons why a low rate of inflation is an important policy objective.

Another -- more important -- reason why an entirely private provision of old age income is likely to fail in providing ALL individuals with an adequate living standard in old age is the fact that there is a substantial number of people whose life time income is inadequate to allow them to accumulate sufficient life time savings. This includes both people with low incomes and those who never hold paid jobs.

Equity and efficiency concerns overlap in the case where individual utility functions are interdependent, i e. if an individual's welfare is affected by the well-being of others. The two principal private sector responses to this phenomenon are intra-family transfers and private charity The public good character of private charity in the case of interdependent utility functions will, however, result in the sub-optimal funding of private charity And the scope of intra-family transfers seems to have declined with the transition from the extended to the nuclear family and other sociological trends.

In summary, an important conclusion of the paper is that there are both

legitimate and serious equity and efficiency concerns with exclusive reliance on private provision of old age income. Among these, the equity concerns appear of a more serious nature given apparent prevailing social preference functions. Thus, unless a country is willing to accept the occurrence of deprivation among its elderly, some kind of Government intervention in the provision of old age income would appear inevitable.

However, government intervention itself impacts on both equity and efficiency, not only in the way initially intended, but also with -- sometimes significant -- side effects. The objectives of Government intervention can be manifold and in the end require value judgements and a political decision making process to formulate them. For the purpose of the analysis in this paper it is suggested that the appropriate objective of Government intervention into the provision of old age income is to guarantee a (socially defined) minimum level of consumption of aged individuals, and to do so with the least possible reduction in economic efficiency in both production and consumption.

In pursuing the desired equity objectives, government interventions drive a wedge between marginal costs and marginal benefits faced by individuals and create other distortions in market signals, which may severely reduce economic efficiency and welfare. Most important among these are distortions in work-leisure decisions and consumption-saving decisions. While it is relatively easy to determine the distortions caused by specific Government interventions in qualitative terms, determining their quantitative importance requires measurement of individuals' reaction to these distortions which is much more difficult.

Empirical evidence suggests that Government intervention in the provision of old age income is likely to reduce personal saving and (life time) labour supply (e.g. through the reduction in retirement age), but the extent of these effects is very much in dispute. While additional information on the quantitative importance of these disincentive effects is highly desirable, experience from the extensive research already carried out in the US suggests it is unlikely that an unambiguous and permanent answer to these questions will be found soon. Thus any decision on Government intervention will have to be based on prior assumptions about the seriousness of the various disincentive effects.

In addition to the problem of disincentive effects, there are various obstacles that prevent a straightforward translation of social objectives into the type of Government intervention most appropriate to achieve them. These problems are analysed in a branch of economics called "public choice theory" and include the lack of interest and limited information of average voters, the conflict between the self interest of politicians and the social welfare objectives they are supposed to pursue (the "agency problem"), imperfections in the voting process, and lack of control of bureaucrats who tend to pursue their own utility maximising objectives.

Among the most serious problems emerging from the public choice approach analysing Government intervention into old age income provision is the problem of biased voting. The age composition of eligible voters at each point of time is such that a large part of the electorate will derive a net benefit from an increase in tax financed old age income support, while a large part of the individuals bearing the cost of such a change (in the form of higher taxes) will not be eligible to vote when the decision is taken. This may lead to an excessive scale of Government intervention when judged by the preferences of a

representative individual at the start of his/her working life.

Related to this problem, and to some extent re-enforcing it, is the shortening of the time horizon of Governments as the election date approaches. This creates a temptation to "buy" the electorate through fiscal largesse -- either actual or promised -- , which is not sustainable in the long run. Alternatively, mounting pressure to reduce Government expenditure may result in hasty and ill-advised alterations to what need to be long term arrangements. There is obviously no absolute safeguard against these risks in a democratic society. The best protection against it would probably be a long term commitment based on the largest possible political consensus together with increased transparency. Once a broadly based consensus has been reached, it might be desirable to cement it in by requiring more then a simple majority vote to change it.

Given the relative strengths and weaknesses of both private market provision of old age income and Government interventions to improve on its results, it is clear that the two should be considered complements rather than substitutes. The relevant question for economic policy is not whether old age income provision should be private OR public, but what the optimal mix of private provision and Government intervention is, given society's objectives and preferences.

Within each of the categories of private market provision and Government intervention a large number of alternatives exist, and for each alternative various parameters determining its absolute size and mode of operation need to be determined. In the case of private provision, these choices will be made autonomously through private contracts in the market. In the case of Government intervention they require public decision making and implementation by the bureaucracy.

There are several issues which are relevant in the context of formulating an optimal Government intervention which are common to all or most of the alternatives open to society. Some of these issues are not directly related to old age income provision but have an important indirect bearing on the role of the Government in this area. These issues include the following:

-- An active immigration policy can greatly reduce the pressure which foreseeable demographic developments are expected to exert on any system of old age income provision;

-- An increase in the eligibility age for old age income support (while taking into account the number of years an individual has spent in the labour force), can also help to reduce the fiscal burden and improve the equity aspects of Government intervention;

-- Inflation in combination with the taxation of nominal interest reduces the real effective interest rate (e.g. on bonds), thus diminishing the ability of the private sector to operate an efficient and secure old age income provision scheme;

-- Tax concessions or other subsidies for private pension schemes are frequently advocated on the basis of second best considerations, to offset the moral hazard concerning saving for old age due to means testing old age benefits. However subsidisation of private saving for old age as an approach to old age income provision should be

rejected on equity grounds as well as on efficiency grounds;

-- Whichever type of intervention into old age income provision is chosen, its implementation should be sufficiently transparent to allow the clear identification of its implications for income redistribution: within age cohorts, between generations, and over the life time of the individual. (Cf. Annex A. for a more detailed discussion of the issues of redistribution and transparency.)

-- The objectives of Government intervention into old age income provision should be limited to assuring a (collectively defined) minimum standard of living rather than enforcing a scheme where benefits are related to pre-retirement income levels. However, if for efficiency reasons a contributory schemes is adopted, earnings related benefits may be a necessary by-product of this choice.

This paper has reviewed the basic options for Government intervention into the provision of old age income and deals with the question of how they address the concerns with both private provision and government intervention. The options have not been developed in detail, since that would have required further discussion and probably more research. The purpose of this presentation has not been to express any preference between the alternative options but rather to highlight the fundamental tradeoffs between competing objectives characterising each option. The various options presented are not mutually exclusive and can indeed be implemented jointly and to varying degrees. The presentation chosen aims at highlighting the distinguishing characteristics of each option as well as spelling out clearly its strength and weaknesses.

One option is to treat Government intervention into old age income provision like any other income maintenance programme. This means establishing a guaranteed old age income which is means tested against all other types of income and possibly against wealth as well. The fundamental problem with such a targeted old age benefit is that it implies high effective marginal tax rates on private saving and (some components of) life time income for benefit recipients, with the consequent disincentive effects on private thrift and labour supply ("moral hazard"). In their extreme form, these disincentive effects may lead to the complete cessation of old age saving and labour force participation, with full reliance on Government support. The attempt to limit the incidence of the disincentive effects to a smaller subset of the population by lowering the guaranteed income level or accelerating the abatement of benefits will lead to a worsening of the equity aspects of the scheme and the creation of "poverty" or "dependency" traps for low income beneficiaries.

Removing the targeting from the scheme will only partly eliminate these problems and introduce others in turn. The high effective marginal tax rates for a subset of the population characterising the targeted scheme would disappear, but a universal old age benefit would still discourage voluntary personal saving and labour supply for the whole population: the financial requirements of such a universal old age income guarantee would increase substantially, requiring a generally higher level of taxation with the concomitant disincentive effects Such a scheme is also very vulnerable with respect to changes in the population age structure and is generally considered unsustainable at present in many countries, due to the projected increase in the old age dependency ratio.

The major difference between these two options is exemplified by the trade off between high effective marginal tax rates for a subset of the population, combined with lower tax rates in general (in the targeted scheme), and higher but uniform tax rates for the total population (in the universal scheme) Another difference is in the overall fiscal cost of these two alternatives. How large this difference will be depends -- for an identical benefit level -- on the strength of the response to the negative incentive effects under the targeted option: the larger the number of people that decides to rely totally on Government benefits, the closer the fiscal cost will come to that of the second, universal scheme. The administrative cost of comprehensive targeting also plays a role here.

Both these schemes have in common the possible choice of individuals to rely entirely on Government benefits in old age, no matter how high their working life income is. Under the first scheme this may entail the result that a high income earner who chooses not to save for old age will receive benefits financed from taxes of a low income earner who either receives no benefits at all (in the means tested scheme, if he saves enough) or receives the same amount as the high income earner (in the universal scheme). Under the universal scheme the high income earner will have made large (implicit) contributions in the form of high tax payments, but there will be little transparency of what the net income redistribution of the scheme is, and the payment of old age income support out of current tax revenue to the well-off elderly may be difficult to sustain politically -- the scheme may not be politically credible.

This inequity (affecting the targeted scheme) and lack of transparency (affecting the universal scheme) can be alleviated by the introduction of a compulsory old age pension scheme, to which each tax payer contributes. Each participant would receive an actuarially fair pension from the autonomous pension fund. Where an individual's contributions are insufficient to provide a pension level at least equal to the socially defined minimum, the Government will have to supplement the individual's income, either during the contribution stage or during the retirement stage. In this way the (forced) saving function and redistribution function of the scheme can be separated, allowing a more rational decision making concerning either of these functions. Alternatively, the contributions of regular participants can be computed in such a way as to cover the future payments of universal benefits for each age cohort. The first two of these options would imply actuarially fair pensions, and means tested subsidies for persons with insufficient income; the third option would maintain a flat rate universal benefit, and there would be no means testing.

If a universal compulsory scheme is chosen in which Government makes contributions on behalf of individuals unable to pay their own contributions or provides a second ("welfare") tier for them, there is a choice as to whether this scheme is administered through a public fund or by private institutions, leaving individuals a choice as to which institution to contract with. The advantage of a single public fund is the possible reaping of economies of scale in administration. The advantage of private administration is greater competitive pressure and thus enhanced efficiency, including a wider variety of options. It is, however, difficult to see how such a compulsory private scheme could be run without rather stringent prudential regulation and an ultimate Government guarantee for solvency, which might mitigate some of the benefits (together with most of the risks) of competition.

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ANNEX A

Disincentive Effects on Personal Saving and Labour Supply:

A Geometric Note

The following is a simple geometric exposition of the effects of Government intervention into old age income provision on personal saving and labour supply. The model chosen is grossly simplified, reducing the individual's life time into two periods, "working age" and "retirement age". For expositional purposes the saving-consumption decision is illustrated separately from the work-leisure decision, though in practice these decisions will of course be made simultaneously.

a) Undisturbed equilibrium

The first set of diagrams shows the saving-consumption decision and the work-leisure decision in the absence of Government intervention.

(Diagram A.   Undisturbed household equilibrium)

b) Effects of lump sum transfers on the budget constraint

The second set of diagrams concentrates on the individual's budget constraint in the two decision processes, and how it is affected by a guaranteed flat rate old age income and a lump sum tax to finance the concomitant public expenditure.

(Diagram B.   Effect of lump sum transfers on the
household budget constraint)

c) Effects of an income tax on the budget constraint

The third and final set of diagrams depicts the effects of a general income tax on the individual's budget constraint in the saving-consumption and the work-leisure choice. This effect can be decomposed into a parallel shift (income effect) and a rotation (substitution effect) of the budget constraint due to the income tax.

(Diagram C.   Effect of an income tax on the household budget constraint)

Government intervention, income redistribution, and transparency

Government intervention into old age income maintenance has a large potential impact on the distribution of income, both within a given age cohort (intra-generational redistribution) as well as between cohorts (inter-generational redistribution). How and to what extend this potential materialises will depend on the specific design of the intervention. Three important questions arise in this context:

-- What impact does a given government intervention have on the inter and intra-generational distribution of income?

-- What degree of income re-distribution should the Government aim at, and what are the criteria for making that decision?

-- How can the implications of intervention (e.g. a specific Government superannuation scheme) for the redistribution of income be made transparent and explicit?

The first of these questions falls into the realm of positive economics, i.e. what is the effect of intervention on the distribution of income. The second question is of a normative character, i.e. what is an -- in some sense -- optimal distribution of income between and within generations. The third question concerns the optimal design of institutions to implement a desired policy of old age income maintenance and its stated objectives. All of these questions are difficult as well as important in the context of discussing the Government's role in old age income provision.

i) Positive analysis

Turning first to the question of inter-generational re-distribution, the effect will be closely linked to the financing mode chosen for public pension schemes. A fully funded scheme (i.e. a scheme were the present value of future liabilities which have accrued in the past are matched by additional net wealth, i.e. real productive assets, or claims on foreigners) will not entail a redistribution of income between generations. This implies that the scheme is actuarially neutral for each generation as a whole.

Between overlapping generations income can be transferred by normal tax-transfer schemes; however in general these will impact on aggregate saving and thus have repercussions for the inter-generational distribution of income between non-overlapping generations as well. The same is true for intra-generational redistribution. In fact any Government policy that impacts on the saving ratio and thus the nation's net wealth position -- whether related to old age income maintenance or not -- will have repercussions on the inter-generational distribution of income. It is therefore difficult if not impossible to separate Government policy towards old age income maintenance

from Government policies in general, -- at least as far as inter-generational redistribution is concerned.

Demographic factors in combination with public pension schemes may also influence the inter-generational distribution of income, especially if the system is not funded. If the system is fully funded, variations in the age composition of the population will entail fluctuations in national saving, but there need not be any inter-generational redistribution.

The mechanism by which income can be transferred between generations is illustrated in Diagram 1. Starting from an equilibrium position characterised by a given saving ratio, net wealth and output per capita, a sudden decrease in the saving ratio will permit a TEMPORARY increase in consumption. Gradually the lower per capita saving will lead to shrinking net wealth and output per capita, until a new equilibrium (t1) is reached, characterised by lower per capita consumption. Thus the generation(s) which decided to increase per capita consumption (and lower its saving ratio) does so at the "cost" of permanently lower per capita income of all future generations living after t'. Only the generations overlapping with the period to - t' will experience a temporary increase in consumption. If a further inter-generational income transfer (between non-overlapping generations) is desired after the new equilibrium has been reached, a further (permanent) reduction in the saving ratio is required. The process is symmetric: current generations can transfer income to future generations by permanently increasing the saving ratio, implying a TEMPORARY reduction in consumption.

(Diagram D. Inter-generational income transfers)

It follows from the analysis in the preceding paragraph that an inter-generational redistribution between non-overlapping generations occurs when the national saving ratio is (permanently) changed, i.e. when the Government superannuation scheme is introduced or modified. Once it has settled down, there will be no further inter-generational redistribution between generations (overlapping or not) resulting from it, though the LEVEL of income and consumption will be permanently affected for all subsequent generations.

Of course changes in the saving ratio (and thus inter-generational income redistribution) may be triggered by events other than the introduction or modification of Government superannuation. On the other hand, not all changes in the saving ratio do necessarily imply an inter-generational redistribution of income. In particular variations in the population growth rate and the resulting shifts in the population's age structure may actually require changes in the aggregate saving ratio in order to avoid an inter-generational redistribution from occurring.

ii)   Normative analysis.

Whether income OUGHT to be redistributed between generations is an altogether different question, and -- like all decisions on redistribution -- requires value judgements and cannot be answered by positive analysis.

If one calculates the present value (PV) of real life time income of representative individuals in different age cohorts at the moment each cohort's working life starts, one will find (ceteris paribus) that individuals in each subsequent cohort are better off as long as there is positive technical

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progress and an increase in the capital/labour ratio, as has customarily been the case. But if one discounts these incomes back to a single point in time, one finds that the representative real income of earlier cohorts exceeds that of later cohorts. This is so because the real rate of interest (used as the appropriate discount factor) typically exceeds the rate of technical progress, which is the rate by which the representative income per capita increases. Which of these two comparisons is relevant in formulating a policy affecting the inter-generational distribution of income? The question is closely related to the determination of the appropriate social rate of discount: if we opt for comparing real income levels between generations as each generation's working life starts, we implicitly apply a zero social rate of discount, as opposed to the market rate, which is applied when we compare PVs of these incomes at a single point in time.

On the basis of the above analysis it is difficult to envisage a government old age pension scheme which implies a CONTINUING redistribution between non-overlapping generations, since that would imply a continuing change (either increase or decrease) in the saving ratio. On the other hand, it is possible to imagine extraordinary circumstances (e.g. war, a prolonged recession) which justify a massive income transfer between generations, but usually these circumstances transcend the question of public pensions and should be dealt with in a wider context of comprehensive government economic policy

There remains the question of the desirability of inter-generational redistribution between overlapping generations, e.g. through the taxation of working cohorts in order to augment the pensions of the aged beyond an actuarially fair benefit. At first glance it seems there may be some justification for this during prolonged periods of rapid technical progress. In this case the average income of the working cohorts will greatly exceed the actuarially fair pensions of contemporaneous old people, and a society with interdependent utility functions may well decide that it is optimal to redistribute some of the (windfall) gains from technical progress.

iii) Transparency

The preceding analysis has made it clear that it is difficult to isolate the redistributive effects of old age income maintenance from government economic policy in general. It is nevertheless desirable to create an institutional framework which makes the interaction of the various components of government policy transparent. For this purpose it would be beneficial to separate the administration of the government pension scheme from the general budget by the establishment of an autonomous superannuation administration, as is the case in all OECD countries except Australia and New Zealand. This is very much in the spirit (and the letter) of the ongoing public sector reform in many Member countries, where achieving transparency is a prime objective.

To avoid UNINTENDED inter-generational redistribution in the future (on account of public pension schemes), the autonomous scheme should be fully funded. Of course major decisions affecting inter-generational redistribution have already been taken in the past when existing pension schemes were introduced and modified, leading to the schemes existing today. In the process large future government pension obligations have accrued, representing a liability currently not appearing in the government's balance sheet. This obligation should be made explicit by transferring to the autonomous pension fund government bonds of an amount equal to the present value of the pension

obligations accrued to date. To protect the superannuation fund against inflation risk, the returns of these bonds should be indexed to the domestic value added deflator. This would greatly reduce the government's temptation to try to reduce its real debt by generating inflation.

Once this transfer has been effected, all pensions will be paid by the autonomous fund. For the government proper there will (initially) "only" be an accounting difference: instead of paying pensions the government will pay interest on its bonds to the autonomous fund. The accrual of future pension claims has to be matched by the fund through a build-up of net wealth from the contributions of its members currently in the working population. Adherence to this principle will prevent (unvoluntary) inter-generational income transfers: variations in population growth rates under a fully funded scheme will induce changes in wealth accumulation (i.e. saving) by the fund, automatically offsetting demographic effects on income distribution which would result from pay-as-you-go financing.

Once the full funding constraint has been imposed for each age cohort, inter-generational income transfers can still be effected (if desired) by pension payments in excess of actuarially neutral annuity payments, financed from general tax revenue or general government borrowing. To the extent this reduces the consumption of the currently working cohorts, the transfer occurs between living (overlapping) generations. To the extent that it reduces national saving, it also involves future generations.

The inter-generational redistribution between overlapping generations can in some sense be made "automatic" be defining actuarially fair contributions with respect to a benefit level expressed as a percentage of current average income. This implies that when technical progress occurs, past contributions will be insufficient to finance current benefit levels, which will have increased in proportion to technical progress. if the resulting shortfall of the autonomous superannuation fund is covered by subsidies from general government revenue, this is equivalent to inter-generational redistribution between overlapping generations. If no technical progress occurs, benefit levels will be stationary, no subsidies will be required and there will be no inter-generational transfer.

While the full funding constraint for each age cohort is adhered to (with or without the above modification), the inter-generational redistribution effect of the government superannuation scheme will depend on the contribution and benefit structure of the scheme. Many alternative combinations are possible. Subject to the decision -- argued earlier -- of paying a flat rate benefit to each participant, they will all fall between two limiting extremes: the first limiting scheme is one of actuarial neutrality for each participating member, in which case there will be no (ex ante) intra-generational redistribution. There will of course be ex post redistribution due to the random character of individual life expectancies.

The second limiting scheme is one where each participant contributes to the scheme according to his/her income (at either proportional or progressive rates), resulting in an intra-generational redistribution from high to low income earners. An alternative to the second scheme is one where each individual is assessed for an actuarially fair contribution, but in those cases where the individual's income is not sufficient to pay all or part of the contribution, the latter is covered by a subsidy out of regular government revenue to the autonomous superannuation fund. In this case the fund itself

will formally have no effect on intra-generational redistribution, which is all determined within the core government budget. It is important to reiterate that the proposed autonomy of the superannuation fund by itself does not imply any real difference from a public pension scheme financed by general tax revenue. Its "only" advantage is to make transfers implied by the contribution benefit structure explicit and thus amenable to conscious choice and decision making. It cannot be excluded that in many countries this may eventually lead to a system effectively quite different from the one presently prevailing.

NOTES

1. The original development of the LCMS is presented in Modigliani and Brumberg (1954); a thorough discussion of the model and its implications can be found in Farrell (1970), and a concise presentation of the LCMS and an overview over the relevant literature up to 1982 is given in Sturm (1983). More recent extensions of the LCMS are discussed in Blundell (1988).

2. Much of the following discussion is drawn from articles in Kahneman, Slovic and Tversky (1982).

3. For example, it has been observed that individuals forecasting flood danger are strongly conditioned by their immediate experience, seeing the future as a mirror of the past. Similarly, the purchase of earthquake insurance increases sharply after a quake and then decreases steadily as memories fade.

4. According to a field survey taken in 1960 (see Pechman Aaron and Taussig, 1968) less than half of non-retired persons over 55 years of age were able to estimate the amount of income they would obtain from their retirement programme and social security. More than two-fifths were unable to estimate their income requirement during retirement.

5. For example, workers in dangerous jobs prefer to believe they are safe, and consequently take inadequate safety precautions. Further, people have some control over their beliefs, through for example screening out new information that contradicts their desired beliefs, which means that these beliefs persist over time.

6. Adverse selection arises from the difficulty faced by insurance companies in assessing the risk category of an applicant. To the extent that an insurer has less information than an applicant about the applicant's risk status, charging a premium based on the average risk of a group will tend to attract the higher risk and deter the lower-risk customers.

7. These studies calculate the before tax rate of return using both cash receipts (dividends or interest) and realised capital gains or losses.

8. In principle such coercion can be avoided by the individual through offsetting transactions in the capital market, which would of course largely offset the main purpose of the scheme. The likelihood of it happening in practice can be greatly reduced by making public pensions ineligible as loan collateral.

9. Individuals' behaviour will also be influenced by a compulsory old age saving scheme -- even if neutral on a discounted present value basis -- if the time profile of the contributions imposed deviates from the time profile of voluntary saving.

10. Whether and how a compulsory pension scheme will influence labour supply via changes in the participation ratio will depend mainly on the eligibility criteria for participation in the scheme: if participation

is restricted to employed individuals, the scheme is likely to increase the participation rate, especially among low income earners, since it makes them eligible for substantial net income transfers over the life cycle in the form of old age pensions only partly paid for during working life. If the scheme also covers individuals not in the labour force, e.g married home makers, incentives go in the opposite direction by not seeking paid employment substantial net income transfers over the life cycle (in the form of retirement income) can be secured

11. Detailed projections of demographic developments in Member countries over the next sixty years are presented in Hagemann and Nicoletti (1989).

12. This statement applies equally to private and public expenditure: a smaller number of children per family will make it easier for heads of household to accumulate retirement saving out of a given income, and a reduced proportion of young people in the population will entail less Government spending on education and child care, freeing resources for old age income provision.

13 This paper only deals with old age income provision as a means to maintain an adequate standard of living for the elderly. It is based on the premise that health and institutional care requirements by the elderly should be met through Government provision/subsidisation of the specific services rather than through cash transfers to the (potential) recipients of these services.

14 Studies in Australia have shown that, under Australian rules, for an employee on around twice average weekly earnings, with only 20 years of contributions to an occupational superannuation scheme, the value of tax concessions can represent about 1.6 times the value of total old age pension payments over a retirement period of fourteen years. There does not therefore appear to be a convincing efficiency argument for tax concessions as a way of reducing the State's future pension liability. And on equity grounds this instrument appears counter-productive.

15. Moral hazard is a term used mainly in the insurance business. There it refers to the reduced incentive of the insured, after he has bought insurance, to act to reduce the probability of the insured event occurring, or to limit the extent of the loss. In the context of Government involvement in the provision of old age income, moral hazard refers to the reduced incentive of individuals to provide for their old age because of the availability of state support.

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Table 1. Percentage of stable salary that can be provided as a pension if 12 per cent of salary is saved each year

Years to Retirement	Retirement Age			
	60		65	
	Real Interest Rate			
	0%	3%	0%	3%
10	6	10	8	12
20	13	23	15	27
30	19	41	23	48
40	25	65	31	76

Table 2.   Incentive Effects of Government Intervention(a)

Effect on (b)	Income effect pre-retirement	post-retirement	Total	substitution effect	total effect
Personal saving (c)					
low income	- - -	+	?	-	?
medium income	- -	+ +	?	-	?
high income	-	+ + +	?	-	?
Labour supply					
low income	-	-	-	-	-
medium income(d)	0	0	0	-	-
high income	+	+	+	-	?

a.   negative: - ; zero: 0 ; positive: +; the number of signs gives an ordinary ranking of the strength of the effect (within a given column and category).

b.   The three income classes listed represents individuals for whom the scheme provides net benefits, is actuarially neutral, and implies a net burden respectively.

c.   Personal saving as defined in the national accounts; the effect on national saving will depend on the response of the fiscal deficit.

d.   Except for individuals whose voluntary saving would have been less than the compulsory levy.

Table 3. Evaluation of alternative interventions

ISSUE	Scheme I	Scheme II	Scheme III A	Scheme III B	Scheme III C	Scheme IV A	Scheme IV B
a. Concerns arising from purely private provision of old age income	(for a detailed definition of the various schemes see explications provided in the text)						
- equity concerns .insufficient old age income	concern met by all schemes via effective floor for old age income						
.actuarial discrimination (by sex, race,etc.)	not possible		feasible for compulsory component		impossible	likely for compulsory component	
- efficiency concerns .bounded rationality	partly met by all schemes to the extent it overlaps with scheme provided benefits						
.inflation risk to retirement saving	partly addressed through indexation of guaranteed old age income floor under schemes I, II, III B and C and IV-B; not addressed under schemes III-A and IV-A.						
.adverse selection in annuity markets	problem eliminated by intervention for the compulsory component of old age income provision						
b. Efficiency concerns caused by intervention							
- effective marginal tax rate .average level	low	high	low (excluding compulsory contributions to obligatory saving scheme)	low	high incl.	low excluding	low
- rate dispersion .tax on old age saving	large	none	none	large	none	none	large
.tax on labour .before retirement	none	none	none	none	large	none	none
.after retirement	large	none	none	large	none	none	large

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Table 3 (cont'd)

I S S U E	Scheme I	Scheme II	Scheme III A	B	C	Scheme IV A	B
- moral hazard with respect to: . old age saving	strong	none	a. for participants not expecting to receive a net transfer: none b. for participants exepcting to receive a net transfer: none	strong	none	none	strong
.post-retirement work	strong	none	none	strong	none	none	strong
c. Equity effects of intervention			Principles of horizontal and vertical equity (with respect to life-time income) may be violated under the various schemes on account of: - moral hazard with respect to saving for old age under scheme I - variations in population growth under schemes not using accrual accounting (e.g. I, II, III-B and IV-B) - systematic differences in life expectancy under schemes I and II (and schemes IIIA, B and C unless functional discrimination in premium calculation is permitted) - differences in time profile of life-time income under schemes which provide flat rate benefits (i.e. schemes I, II and III-C)				
d. Administrative concerns - risk of voting bias	small	large	small(due to means testing and/or accrual accounting)				
- flexibility of options	low		moderate			great	
- target efficiency in terms of income	- including earmarked acturially fair component: high	mode-rate		low	mode-rate	low	low
adequacy	- excluding earmarked acturially fair component: high	mode-rate	very high		mode-rate	very high	
- financing cost out of: . general revenue	moderate	high	low		none	low	
. earmarked contributions	none	none	high	high	high	private funds only	

Table 3 (cont'd)

I S S U E	Scheme I	Scheme II	Scheme III A	B	C	Scheme IV A	B
- administrative costs due to: . no of people covered . means testing	low high	high none	high none	high high	high none	privatised high	high
e. Transparency issues - accrual accounting	no	no	yes	only for comp. contr.	yes	yes	only for comp. contr.
- separation from general buget	no	no	for contribu-tory compo-nent of scheme (& all expen-diture)		yes	for contribu-tory component of scheme (& all expen-diture)	
- transparency of redistribution	mode-rate	low	high	high	mode-rate	high	high
- security/certainty of benefits	low	low	high	high	high	high, subject to prudential supervision	
- sustainablity/ credibitliy	high	low	high	high	mode-rate	high	high
f. social norms - "dignity" concerns	yes	no	no	yes (less than 1)	no	yes (less than 1)	yes
- contributary principle (earned right vs. welfare)	no	no	yes (except for transfer component)	yes	yes	yes	yes
- degree of government involvement	mode-rate	large	large (but depends on interpretation of autonomous public pension fund)			moderate	
- degree of compulsion	low	high	very high		high	very high	

Diagram A. Undisturbed Household Equilibrium

Consumption-Saving
Decision

Work-Leisure
Decision

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Diagram B. Effect of lump-sum transfers on the household budget constraint

Saving-Consumption budget constraint
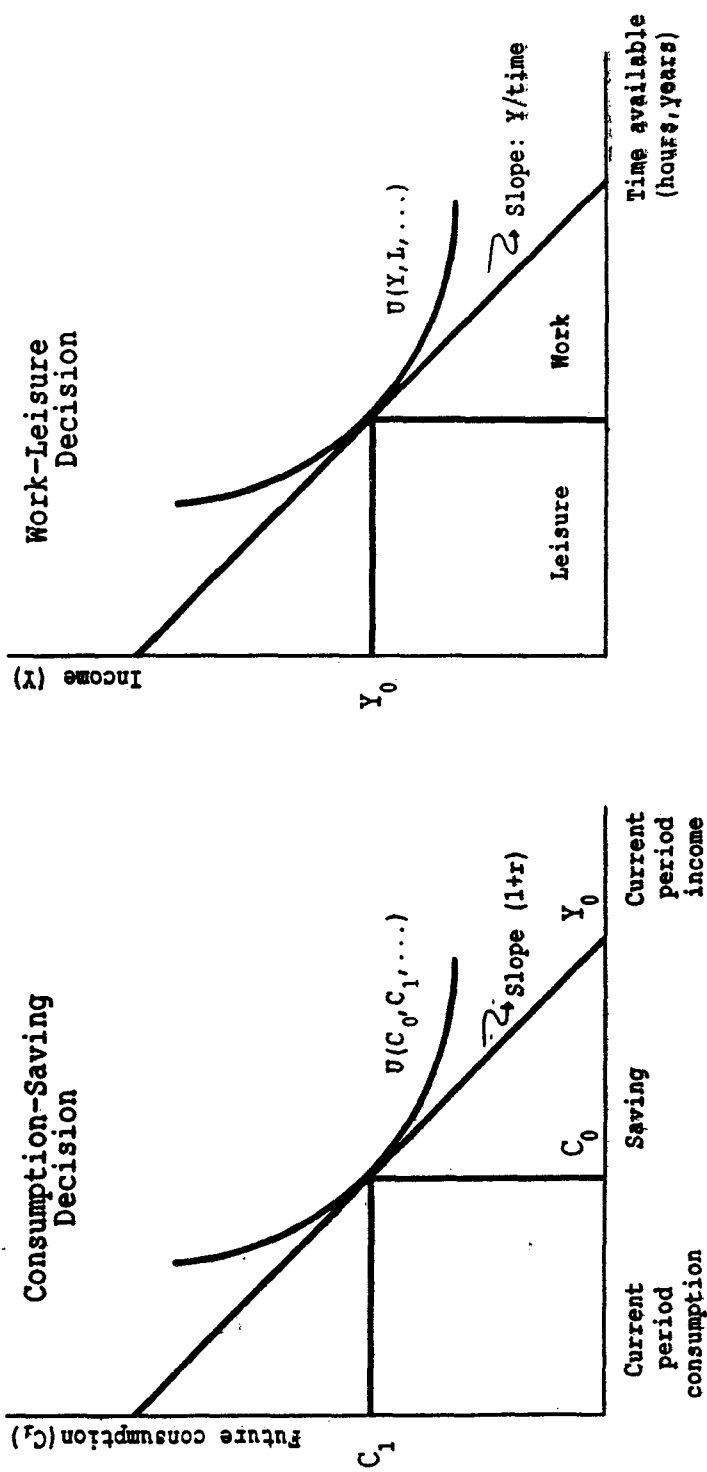
Earned Income-Leisure budget constraint

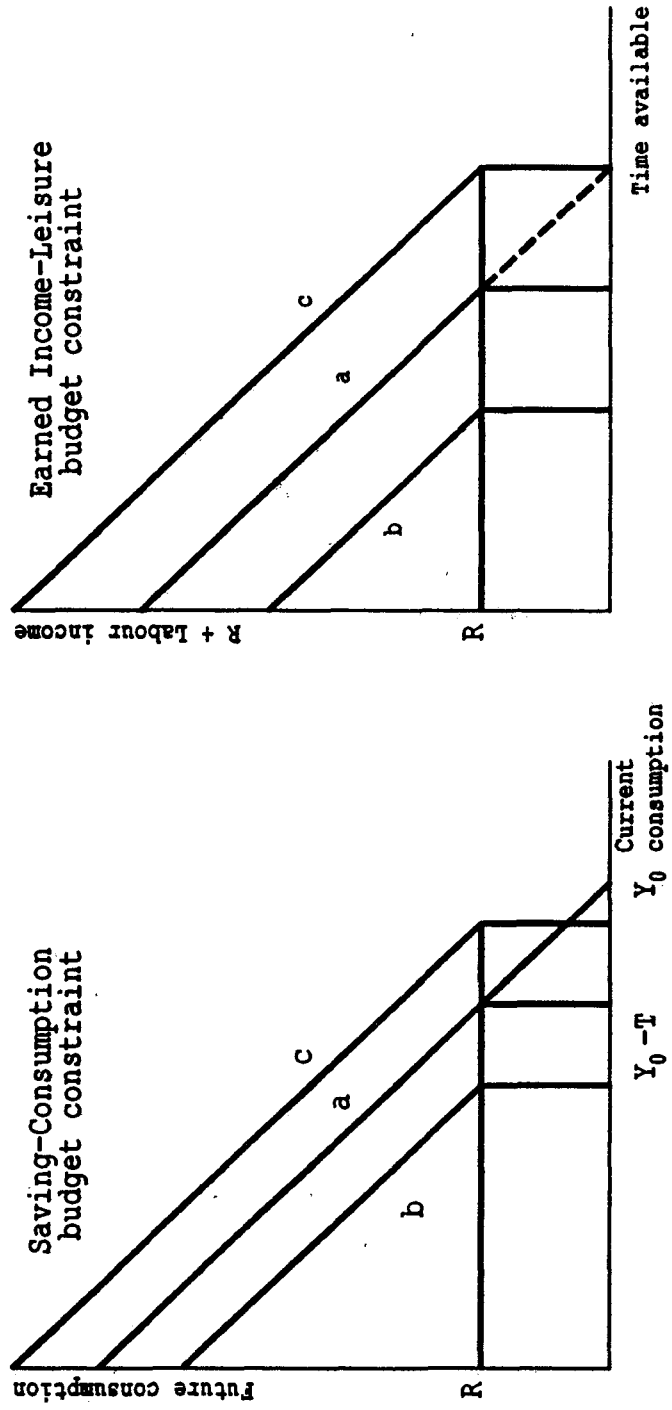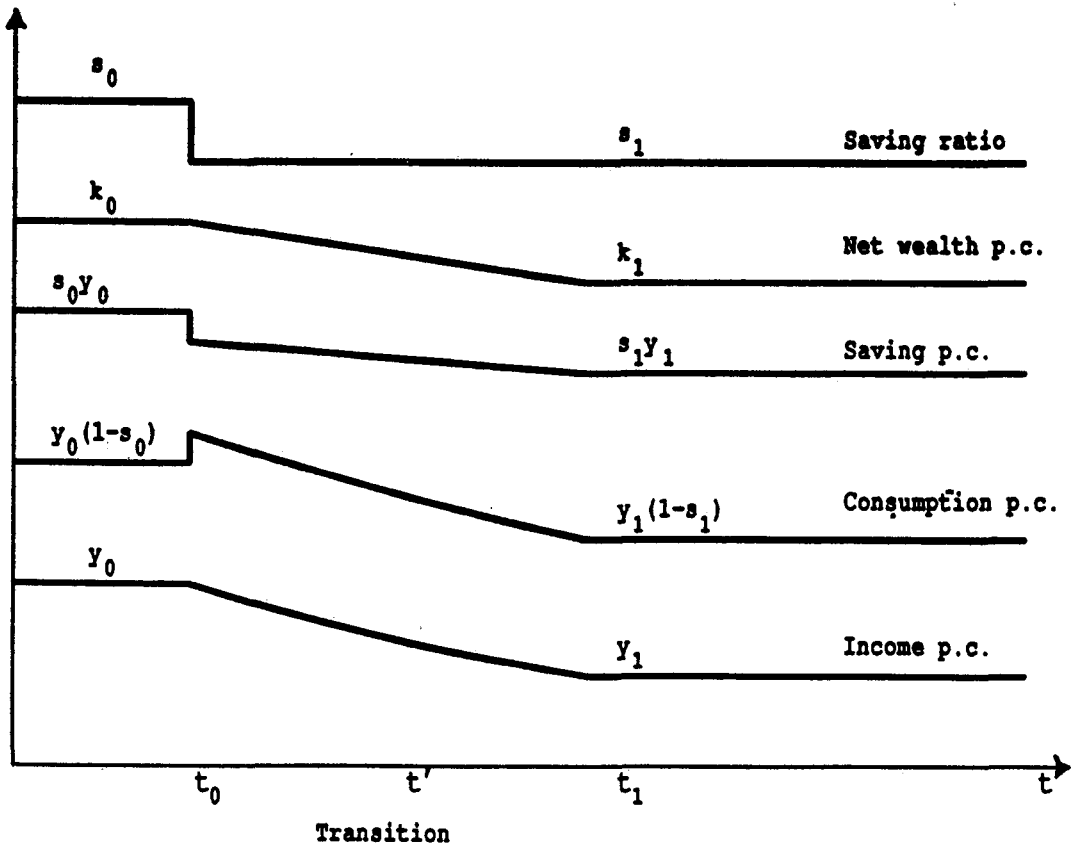Diagram C. Effect of an income tax on the household
budget constraint
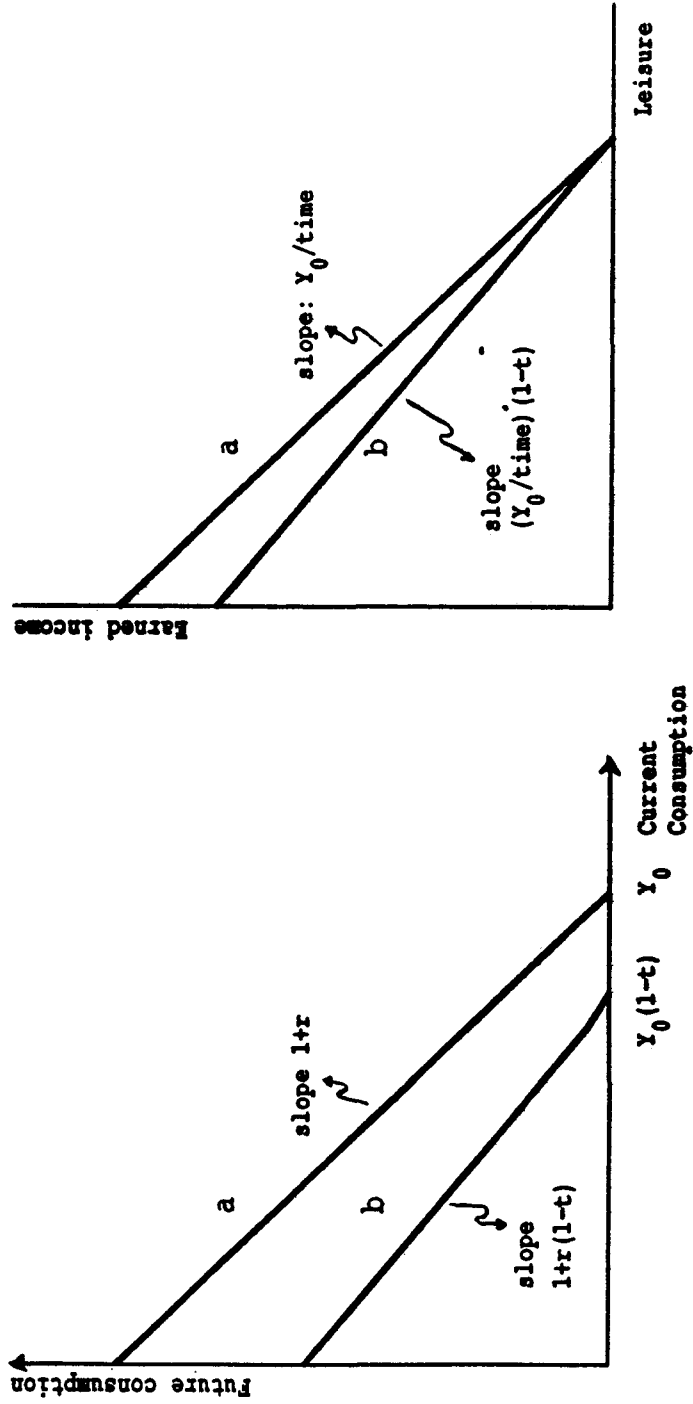
Diagram D. Intergenerational Income Transfers

a. Comparison of equilibria
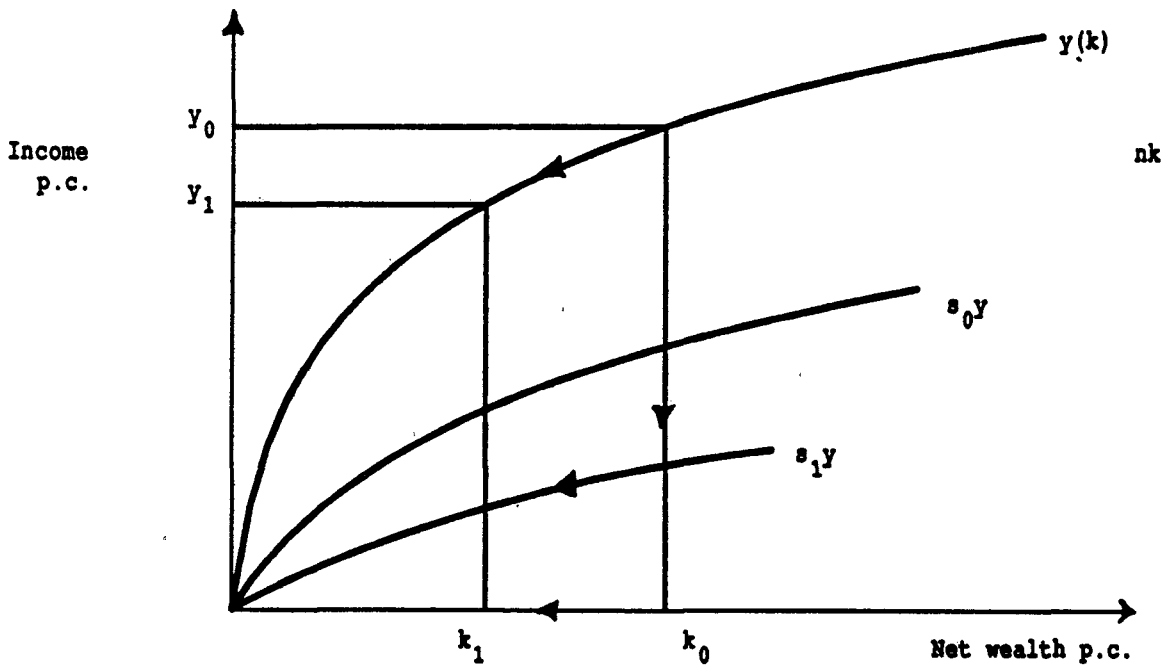
b. Adjustment paths (t_0 to t_1)

Transition

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