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Declining public pensions in an era of demographic ageing: will private provision fill the gap?

by

Richard Disney*

Address for correspondence:
School of Economics,
University Park,
University of Nottingham,
Nottingham NG2RD, UK
Email: richard.disney@nottingham.ac.uk

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* Professor of Economics, University of Nottingham, and Research Fellow, Institute for Fiscal Studies. Work on pensions at IFS is financed by the ESRC Centre for the Microeconometric Analysis of Fiscal Policy. Participants at EEA 1999, Santiago, at the British Society of Population Studies Annual Conference 1999, Dublin, and a seminar on 'pensions and ageing' at the University of Bristol are thanked for comments.

Abstract

Demographic crisis and imprudent commitments have induced a crisis in public pension programmes in OECD countries. Will present and prospective cutbacks lead to greater private saving, either in the form of private pension provision or in other forms of saving? The paper surveys existing evidence, and provides new results on three questions: Do individuals substitute private for public provision of savings when public pension programmes are cut back 'voluntarily'? Do individuals respond to incentives to join sponsored or tax subsidised arrangements if encouraged by the government? And, if individuals are prepared to make such arrangements, and where saving is voluntary, do they save 'enough' to replace previous prospective public pension flows?

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1. Introduction

The well known crisis in public pension programmes in OECD countries has been caused by the demographic transition to an aged population, and imprudent spending commitments. As a result, many countries are cutting back public provision (for descriptions see, for example, OECD, 1996, 1998, and Disney, 1999). A key policy issue is whether these cutbacks will lead to greater household saving for retirement, either in the form of private pension arrangements, or through other private saving vehicles. If this saving occurs, then the impact of cutbacks on living standards of retired generations now and in the future will be ameliorated.[1] If it does not, the likelihood of intergenerational conflict over social welfare programmes will be exacerbated.

A number of commentators, notably in the United States, also believe that raising the private saving rate is a good thing *per se* and that generous public transfer programmes have hindered this in the past. It is, of course, basic to the stylised life cycle hypothesis of saving that public (social security) programmes displace private saving, and even more clearly offset private *retirement* saving. There may also be substitution between private retirement saving and other forms of saving – this, for example, has sparked a major debate in the US as to whether new retirement saving instruments (IRAs, 401k and Keogh plans) have increased the private saving rate.[2]

Even if evidence of substitution exists, however, there is still the issue of whether the relationship is symmetrical at the aggregate level. Increased generosity of public pension programmes may have been a factor behind declining private savings rates, but it does not thereby follow that, if public programmes are less generous in the future, private savings will 'automatically' increase. Market failures may preclude individuals, or financial institutions, from providing appropriate saving instruments (especially, private retirement saving instruments). If the government believes that market failures exist, they may take the initiative in 'kick-starting' the private sector by subsidising (e.g. tax relieving) particular private retirement saving plans at the same time as social security commitments are cut back. In fact the 'voluntary' route of offering incentives to individuals to make

private retirement saving arrangements at the same time as public commitments are cut back has proved a popular form of pension scheme transition in recent years (see Disney, Palacios and Whitehouse, 1999).

This paper considers the possibility of private retirement saving replacing public pension programmes in three stages:

- Is there evidence that individuals might 'automatically' increase their savings as public pension programmes are cut back?
- If the government couples public pension cutbacks with new retirement saving opportunities, do individuals respond to incentives to join sponsored or tax subsidised retirement saving arrangements?
- If individuals do join government-sponsored private retirement saving arrangements, do they save 'enough' to replace previous prospective public pension flows where contributions are not wholly mandatory?

A primary argument of the paper is that the best way of determining the magnitude of these effects is to exploit variations in policy impacts across individuals – for example, in the present context, pension reforms that affect cohorts differentially, or new private programmes with incentives that differ across households. This approach is followed through more fully in Blundell, Duncan and Meghir (1998) in the context of tax reforms.

In passing, it should also be noted that there are other important margins of substitutability (see also Börsch-Supan, 1997). For example, public pensions and private intergenerational transfers may be to some degree substitutes - cuts in public pensions may also be associated with a reduction in bequests in the future, or increased bequests now from generations who did 'better' out of the public scheme to those in the future who are likely to fare 'worse'. A further 'margin' is the 'induced retirement' effect noted by Feldstein (1974), by which increased generosity of pension schemes has an impact on the quantity and timing of labour supplied over the lifetime. This may simply reflect a wealth effect, but it should be noted that different types of pension schemes have different work incentives and that a switch from, say, public unfunded defined benefit plans to private funded defined contribution plans induces quite different retirement behaviour. These issues are not considered here for reasons of brevity.

The outline of the paper is as follows. The next section contains a brief analysis of private and public provision in OECD countries. The remaining sections then examine each of the three margins of substitution highlighted above. The paper suggests that there is some evidence that households do increase saving in the face of prospective cutbacks in public pension wealth, and that households respond to opportunities to switch out of unfunded social security into private funded retirement saving vehicles if opportunities arise. There is less agreement on whether individuals will save enough in private arrangements fully to compensate for losses in prospective public pension wealth. This may reflect myopia or market failure, but also the possibility that in the past, public pension programmes have over-annuitised some groups of individuals.

2. OECD: The stylised facts on the public-private balance in the provision of retirement income

The macreconomic evidence

Historically, provision of income in retirement has developed along distinct paths in different OECD countries. At one extreme is the Beveridge model of a floor of public provision supplemented by voluntary or mandatory private retirement saving arrangements and, at the other extreme, comprehensive Bismarck-style earnings replacement (see World Bank, 1994 for a discussion of alternative 'models' of pension provision). In countries which have adopted the latter strategy, private provision of retirement saving has largely been crowded out. Indeed, only a minority of OECD countries has substantial private pension assets. According to OECD (1998) Table V.1, data for 1996 suggest that the assets of pension funds as a % of GDP were highest in Switzerland (117%), the Netherlands (87%) and the UK (75%), followed by the United States, Ireland, Japan and, some way behind, the Scandinavian countries. No other OECD country has a ratio of over 20%, and many countries had no reported pension fund assets at all.

We can formalise this finding. Table 1 provides a simple reduced form cross-section regression of pension fund assets as a % of GDP in each OECD country in 1995-96 on GDP on public pension expenditure as a % of GDP, with real purchasing power parity GDP per capita and the % of the population aged 65 or over as additional controls.

Given the lower bound of zero pension fund assets at zero, it utilises a Tobit specification.[3] In column 1, there is evidence of significant substitution between private pension funds and public pension systems. Taken at face value, the coefficient implies that a rise in public pension spending commitments from, say, the current level in the Netherlands to that of Germany or Sweden would be associated with a halving of the value of private assets. Not surprisingly, too, there is a positive relationship between the accumulation of pension assets and the proportion of elderly people in each country, although less significant.

It also appears that the accumulation of assets is highly sensitive to the level of GDP per capita. This may arise because the process of growth of real per capita income is associated with the development of financial markets, which permits the establishment of a private pension sector, or simply because private pensions are, in the aggregate, a superior good.[4] The coefficient implies that a doubling of GDP per capita from (say) $10,000 to $20,000 would be associated with a 20% increase in the value of pension fund assets, *ceteris paribus.*

A natural object to the results in column 1 is that public pension expenditure itself depends on the age structure and, possibly, real GDP per capita. In column 2, therefore, private assets are regressed on age structure, real GDP per capita and the 'residual' generosity of the public pension plan, which is obtained as the individual country residuals obtained from an auxiliary equation in which public pension expenditure is regressed on GDP per capita and the proportion of the population of working age in *1960*, being a proxy for the number of elderly 35 years later. It will be seen from column 2 that there is still a negative relationship with public pension expenditure and a positive and significant relationship with GDP per capita. The age effect is less clearly defined – in fact there is a strong relationship between fraction aged 65 and over and *public* pension expenditure and between GDP per capita and *private* pension assets. Overall, therefore, lower public pension commitments may encourage the development of a private pension sector, but the level of real income and, presumably, of financial development of the economy is also highly relevant.

Table 1

Private pension funds, public pension expenditure, demographics and GDP in OECD countries

Dependent variable= ln(pension fund assets as % GDP)	(2) Coeff.	s.e.	(1) Coeff.	s.e.
Public pensions as % GDP	-0.32*	0.12	..	..
Predicted public generosity	..	..	-0.26**	0.13
% aged 65+	0.36*	0.15	0.21	0.13
ln(GDP per head)	2.79*	0.70	2.50*	0.73
Constant	-27.67*	6.73	-25.21*	6.87
Censoring parameter (Tobit)	1.26	0.20	1.33	0.21
Log likelihood	-40.29	..	-41.42	..
$\chi^2(3)$	27.42	0.00	25.15	0.00
Number of obs	29	..	29	..

- significant at 2.5% level **significant at 5% level

Data source: OECD (1998) and OECD web site.

The microeconomic evidence

There are now several studies that examine income replacement and pension provision across samples of OECD countries using comparable household-level data sets. Examples are Disney, Mira d'Ercole and Scherer (1998) and Johnson (1998); the former also includes some discussion of household wealth-income ratios. A striking feature of these studies is that they illustrate how, on the one hand, different *public* retirement income delivery systems provide very similar replacement ratios at the *lower* end of the nt income distribution across countries while, on the other hand, the *combination* of private and public provision provides similar overall replacement ratios for households elsewhere in the income distribution (see, for example, OECD, 1998, Figure IV.3). These findings are illustrated in Figure 1, taken from Disney *et al* (1998) *ibid*, for the lowest and top quintiles of the income distribution.

Whilst it is perhaps implausible to talk about private saving having been 'crowded out' at the lower end of the income distribution,[5] it is interesting to note from Figure 1 how, in the presence of 'floor' public pension programmes such as in Australia, the Netherlands and the UK, there are substantial private resource flows after retirement among the top quintile. Each of these countries is, however, characterised by a strong and mandatory occupational pension sector supplemented by individual saving arrangements. Japan also has company-level pension provision and only Italy stands out as a country with a high replacement ratio and low public provision in the top decile despite low coverage by

organised private pension schemes.[6] These data, therefore, with certain qualifications, support the interpretation of the macroeconomic data from OECD in providing evidence on public-private pension substitutability in practice.

3. What happens to private saving when public pensions are cut back?

The impact of pension wealth on saving

Many studies have attempted to quantify the effect of pension wealth on private saving in a more systematic manner than our stylised facts concerning OECD countries.[7] Much of the basic theory, however, relates to the impact of pension wealth on other forms of saving and not on the impact of public unfunded pension programmes on saving *per se*. Thus the implicit 'experiment' in the last section - would private pension wealth be higher if public provision was less generous? – cannot be answered directly by such studies. Even if the measured offset between public pensions (social security) and private saving is conditioned on the household having additional private pension wealth as in Kotlikoff (1979), the intrinsic endogeneity of private pension wealth cannot be easily handled. The 'cleanest' test of the substitution hypothesis should occur in a country such as Italy, with little or no private pension wealth, as in Jappelli (1995). In general, however, the response of private saving to a cutback in social security will depend on the nature of private retirement instruments available at the time.

In a 'pure' life cycle hypothesis (LCH) model with no longevity risk and no precautionary saving, pension wealth should fully offset private saving. With longevity risk and/or disproportionate tax reliefs to retirement saving, provision of pensions could have more than one for one offset, independently of whether the pension programme is funded or not (Gale, 1998). But as pensions are illiquid, they may crowd in other saving if there is a precautionary motive for saving (Hubbard, 1986). Indeed a precautionary motive generally reduces the degree of substitutability of pension wealth for other forms of saving. And, in an argument often stated by Douglas Bernheim, creating new saving opportunities may increase public awareness of saving vehicles and so increase saving. Nevertheless, the overall elasticity of saving with respect to pension wealth can be any number from less than minus one to a positive number; a variation which is reflected in

coefficient estimates, although such estimates tend to average somewhere between zero and minus one.

There are also measurement issues. Gale (1998) points out that pensions can be regarded as shifting the remuneration package across time. Thus the estimated offset, measured on *current* income, will vary systematically across age and will typically be underestimated if the remuneration-shifting aspect is ignored. When Gale adjusts pension wealth to allow for this age-related bias, he gets average estimates from median regressions of the saving impact of –0.92 for private pensions and –0.51 for public pensions. Miles (1999) also points out that treating *income* from pensions as anything other than decumulation of assets (for example, by including it in the denominator of the savings rate) will also induce systematic bias.

A basic problem is the measurement of pension wealth. Blake (1999) details a number of studies that use largely *ad hoc* measures of aggregate or individual wealth; measures which are rarely tested against known actuarial forecasts. Blake's own solution is to utilise explicit actuarial measures of *accrued* pension wealth of different types in his estimation procedures (see below). Even this, however, may not be the appropriate measure since *projected* pension wealth is typically more sensitive to policy changes than accrued rights because the latter are generally protected in the face of policy changes such as changes to accrual rates and indexation rules.

Time series analyses of consumption and wealth

Almost all the early analysis of the impact of pension wealth on savings used time series analysis.[8] With the increasing availability of household data sets, this approach has become less common. In addition, given the difficulty in measuring aggregate saving rates, studies have sometimes examined the relationship between aggregate *consumption* and pension wealth. A recent example is Blake (1999), who finds a positive 'elasticity' of consumption with respect to public pensions (social security) and a negative 'elasticity' with respect to private pension wealth. At face value this implies that a negative shock to social security wealth reduces lifetime wealth (permanent income) and so increases the need for current saving. Conversely a positive shock to private pension wealth, although raising permanent income, raises the saving rate for reasons that are not clear (especially given the contrast with the Gale result above). One route may be because private

pension saving has in some way become more attractive, for example through a persistent favourable shock to the capital market, or because the individual anticipates retiring earlier and so needs to do more of other kinds of saving. There are, however, potential pitfalls in the interpretation of coefficients in such models.[9]

Cross section analyses

Standard LCH analysis predicts a positive association between consumption and wealth in the cross section. However this will not be one for one as, conditioned on age, the wealth-income ratio and, therefore, the saving-income ratio rises with income. A key problem is heterogeneity arising from preferences – for example, evidence that savers in one asset tend to save in other assets, and that stocks of different assets are *positively* correlated across households. Unless heterogeneity is handled correctly, it is hard to get clear offset effects.

There are, however, other systematic aspects to heterogeneity. For example, low income people tend not to save at all. Hubbard (1986) excludes households with low financial assets from his estimates completely, and obtains selectivity-corrected elasticities of –0.33 on social security wealth and –0.16 on private pension wealth. But these offsets vary considerably across households. For high levels of private worth, Hubbard suggests, offsets are much greater although there is evidence of a bequest motive among families with high wealth-income ratios. Another feature is that private pension schemes are typically less redistributive within generations than social security programmes. So, leaving aside Hubbard's point, we might expect 'average' pension scheme generosity, especially in the public programme, to have more impact at the lower end of the income distribution. Conversely *coverage* of private plans is distributed towards the top end of the income distribution, so impacts on other forms of 'free' saving might be stronger there. There are also systematic age effects as pension rights accrue, which are specific to the type of programme.

Pension expectations and 'natural experiments'

The evidence from time series analyses of how private saving responds to variations in the generosity of pension programmes cited previously is at best inconclusive. A simple graphical illustration of this conclusion can be gleaned from Figure 2, which plots the time path of the generosity of the basic state retirement pension in the United Kingdom

over almost fifty years, relative to the personal savings rate. There are two distinct 'peaks' in the generosity of the UK public pension programme: in the early to mid-1960s, and in the late 1970s when benefits were indexed to the faster of prices or earnings growth. However the personal saving rate rose slowly until the beginning of the 1980s, when it collapsed before recovering at the very end of the period. It is hard to see any clear relationship to the generosity of the public pension programme, and these saving trends would seem to have been affected more by income expectations and the financial liberalisation of the 1980s.

In the case of cross section analysis, there is more agreement as to the direction of the effect but there is a high degree of heterogeneity in behavioural responses and a mass of measurement issues. An important issue concerns the use of data on projected pension wealth, which can rarely be obtained from cross section data sets. An interesting extension is the work of Japelli (1995), who uses self-reported expected retirement dates to construct his household measure of social security wealth. He finds that the increased generosity of the Italian social security programme in the 1970s and 1980s may have contributed to up to one fifth of the fall in the Italian private saving rate. However, such a study does not take account of whether the expected values of pensions are themselves credible given the trends outlined above.

The most promising approach, therefore, is to incorporate expectations concerning the future generosity of the pension programme into estimates of household saving behaviour. Furthermore, discrete events that might cause individuals to alter their expectations concerning pension wealth should form a 'clean' test of the substitution/offset hypothesis, and of the possible magnitude of behavioural responses to changes in pension wealth. This is in the spirit of the paper by Blundell, Duncan and Meghir (1998) on UK tax reforms and labour supply, and of numerous reduced form studies in the United States in other fields of labour economics.

This approach has been taken up in the pension and saving context by Attanasio and Brugiavini (1999). They use as the 'experiment' the 1992 pension reform in Italy (known as the 'Amato' reform), which, after much public debate, cut back prospective pension entitlements following a long period of increasing pension generosity. This reform is assumed to constitute a 'shock' to prospective pension wealth, which should induce

households to save more. Crucially, the impact on pension wealth of the shock varies across individuals both by virtue of their age (stage of the life cycle) and because the exact impact of the reform was heterogeneous, differing, for example, between public and private sector workers. In particular, older workers should be more fully affected than younger workers by an identical shock to pension wealth, given proximity to retirement reduces the scope for absorbing wealth shocks. In fact the exact mechanics of the reform protected workers close to retirement. Consequently oldest and youngest workers should be least affected by the reform and their saving response should be the lowest.

Attanasio and Brugiavini use a differences of differences approach by which changes in pension wealth and savings rates are calculated for a variety of groups, and the latter is regressed on the former. For this methodology to work, there must be variation in the differences across groups arising from the reform. The effects are allowed to vary non-linearly with age and the resulting coefficients are plotted relative to age in Figure 3. They suggest that the strongest effect of changes in pension wealth on personal savings rates are found among middle-aged heads of households, with complete offset for the the group aged around 30 to 50. No evidence of substitution can be found for those near retirement (but this group had little change arising from the reform) or for the young.

Although these results are reform and country-specific, they give some suggestion as to a plausible method of pursing the issue. It might be argued that the time series evidence for Italy, which is more transparent, also supports this result because the personal saving rate in Italy jumped in 1993, the year after the reform. On the other hand, aggregate evidence of that type can yield inconclusive results. For example, in the United Kingdom, the personal saving rate, illustrated in Figure 2, bears little relation to the prospective changes in the generosity of the public pension programme. Reforms which were implemented, or proposed, to increase the generosity of the pension programme generally took place in the first half of the period, in which personal savings rates were rising (such as the 1946 introduction of National Insurance, the introduction of graduated pensions in 1961, the first proposal for comprehensive earnings-related public pensions in 1968, and the legislation of 1975 which introduced the State Earnings-related Pension Scheme (SERPS). Conversely, when generosity was cut back (as in the 1981

decision to deindex pension benefits to earnings, and the 1986 and 1995 legislation to cut back SERPS) the personal saving rate was falling.

4. How do individuals respond to choice of pension schemes?

Countries which have cut back public pensions have also actively considered measures to introduce private, funded, schemes. In some cases, these transitions to funded schemes have been dramatic, notably in Chilean and other Latin American countries, but other countries have also introduced new private retirement saving schemes at the same time as the reform of existing schemes takes place: notably in the United Kingdom but also in transition economies such as Hungary and Poland. In almost all countries, however, including Chile, while membership of a pension scheme is mandatory, the option of remaining within the existing, unfunded public programme remains. In the UK, for example, individuals can choose to remain opted-in to the State Earnings-Related Pension Scheme (SERPS) or to opt-out (thereby paying a lower contribution to the public scheme) into a variety of defined benefit or defined contribution private funded schemes.

An important policy issue, therefore, concerns individual take-up of new pension opportunities. Do individuals respond to such incentives and, more particularly, do the 'right' individuals respond to the choice between public and private arrangements? It might be thought that, for standard dynamic efficiency reasons, individuals should automatically switch to a funded scheme if the government offers an opportunity to substitute such provision for public unfunded pensions (see Feldstein, 1996, 1998). But it is important to bear in mind that funded defined contribution (DC) schemes and unfunded defined benefit (DB) schemes have different accrual structures, and that the individual returns to 'switching', when there is a choice, vary across individuals.[10] In particular, the incentive to switch is greater for men rather than women, rich rather than poor (if there are fixed costs to individual accounts), and young rather than old.

To demonstrate this, assume that in the DB plan, the object is to obtain a *target Replacement Ratio (RR*)* as a fraction of average earnings. The accrual structure for pension *p* in the DB scheme can be written as:

$$p_{i\,PAYG} = a_{\ i}\ n_i \sum_{t=0}^{R_i} w_{it} I_R \qquad (1)$$

where $I_R = \overline{w}_R / \overline{w}_t = (1+\overline{w})^{R-t}$

and where a_I is the annual accrual rate specific to a member of the i[th] cohort, n_I is the number of years service and R_I is the average retirement age of the cohort. Accrued rights may be indexed by a revaluation factor to retirement, I_R, related to average earnings growth, ϖ. The PAYG equilibrium contribution rate, c_t*, of course requires that:

$$c_t^{\ *} = \sum_{i=1}^{N} P_{it} \Big/ \sum_{i=1}^{N} \overline{w}_{it} L_{it} \qquad (2)$$

i.e. P, the sum of all pension payments to the members of N cohorts, is equivalent to the sum of contributions levied on workers (L) in each cohort.

Alternatively, assume that the individual can choose to invest in a generic system of individual retirement saving accounts of the defined contribution form. The accrual structure for this type of scheme can be written as:

$$p_{i\,DC} = a_R \sum_{t=0}^{R} c_t w_{it} (1+r)^{R-t} \qquad (3)$$

where a_R is the annuity rate appropriate given the expected average mortality of cohort i, and r is the expected real rate of return on the accumulated fund.

In theory, the individual should evaluate these accrual structures and to calculate which scheme, or perhaps which amount of time spent in each scheme (depending on the rules concerning switching) will maximise the pension. In the DB plan, the marginal accrual depends on the growth of the real wage measure on which the pension is based and on the number of years service, whereas in the DC plan, fund growth is related to expected return and annuity rate, subject to the simple insight that a $ invested at an earlier stage compounds for longer than a $ invested later. In addition, people close to retirement may feel that a DB plan offers greater security than a DC plan, whereas younger people may expect less from the unfunded plan in an era of demographic transition. This leads to the prediction that, if we have data on take-up rates across characteristics, and if individuals respond correctly to incentives, younger individuals should be more likely to

switch to a DC plan, once they have embarked on reasonably secure labour market careers. More speculatively, for reasons of lower labour market attachment, and redistributive features that are often built into public pension plans, take-up of DC-type funded plans should be lower among men than women.

Figure 4 illustrates differential take-up rates at the start of pension reforms for three countries that introduced switching opportunities. Chile in 1992 is the most mature example of a 'privatised' pension programme, and it is apparent that all young people have switched (indeed the number of participants in the programme is higher than under the previous social security system). At an earlier period (say, the 1980s), the switching proportions would have looked comparable to those in the other countries illustrated here. A clear negative relationship between age and the switching probability is observed, although the rate of switching is higher among women than men.

Argentina and the UK, which permitted opt-out from traditional DB-type social security into individual retirement accounts from 1994 and 1988 respectively, exhibit very similar features, with high rates of opting-out among younger people, and a higher rate among men than women. The lower rate of switching in the UK in part arises from the existence at the time of the reform of a large occupational pension sector of private and public (non-social security) DB plans, and individuals in those plans did not in general purchase the new retirement saving accounts, known as Personal Pensions.

Hungary is one of the newest reforming countries, with the opportunity to switch to a new funded DC accounts developed in 1997 (Palacios and Rocha, 1998). The figures are taken from November 1998 and a similar age-related pattern is observed. Like Chile, however, women seem slightly more likely to switch than men. However the common features to all these four countries are, firstly, the great responsiveness of individuals to new retirement saving opportunities even when switches are not mandatory, and second, the pattern of age-related switching which is consistent with the relative accrual structures of DB plans, such as public pension programmes, and DC plans such as systems of individual retirement accounts. We can draw the tentative conclusion from this that policy interventions to promote new funded retirement saving instruments at the same time as public pension programmes were cut might lead to an enthusiastic individual response.

5. Do individuals in government-sponsored private retirement saving arrangements save 'enough' to replace previous prospective public pension entitlements?

The analysis so far has suggested that public pension cutbacks might both induce more private saving and also the take-up of alternative, funded, retirement saving instruments were these to be made available. There remains, however, the important question of whether individuals save 'enough' when given greater choice of investment strategy to provide for retirement income later in life. A standard argument for mandatory, public, intervention is that individuals are myopic. To the extent that pension reform is accompanied by greater emphasis on private, voluntary, saving arrangements, the concern over myopia becomes important.

If individuals have perfect foresight, a transition from unfunded to funded pensions may actually involve a *reduction* in 'voluntary' personal saving for retirement, leaving aside the purely accounting switch from tax finance to fund accumulation. This simply arises from the first order gain to prospective pension rights with a given contribution rate obtained from exploiting dynamic efficiency (Feldstein, 1996). But since mandatory contributions must now in part be diverted to financing existing pension liabilities, and since public pension reforms are often explicitly designed to reduce contribution rates, mandatory contributions into private, funded, schemes are usually rather small. For example, in the United Kingdom, the 'contracted-out rebate' paid into a Personal Pension is age-related but varies between 3% at age 15 and 15% at age 60 (HMSO, 1994).[11] The minimum level of employer support of the Superannuation Guarantee (SGC) in Australia is set at 4% with plans for it to rise to 9% by July 2002, but the SGC has already been reduced because employers perceived it as an additional tax. In 'partial' transition economies such as Hungary and Poland, contributions to the funded schemes comprise 8% and 9% of payroll respectively up to a ceiling. In all these countries, of course, these contributions supplement public pensions, which usually provide an income 'floor', but unless those public programmes turn out to provide substantial pensions, simple actuarial calculations suggest that the replacement rates provided by contributions of 3-9% of payroll are going to be rather low unless investment returns exceed the 5-6% usually assumed in such projections. Thus there may be a need for individuals to supplement these mandatory contributions by further, voluntary, contributions to their

retirement saving plans. Will individuals undertake the required level of saving in such circumstances?

There are two forms of microeconomic evidence that might be used to address this issue. First there is the evidence of whether individuals save 'enough' in voluntary arrangements already. Secondly, there is evidence concerning participation in, and contributions to, 'mandatory' funded retirement programmes. I deal with each in turn.

Bernheim and Scholz (1993) have expressed concern as to the adequacy of retirement saving of US families, using a simulation model described in Bernheim (1992). The presumption is again derived from the LCH saving model that households save to smooth consumption over the lifetime. Using a calibration model to simulate asset accumulation profiles, Bernheim constructs the hypothetical saving and asset profiles for different household types that would be sufficient to maintain smoothed real consumption levels over the lifetime. These are then contrasted with actual saving, wealth and consumption trajectories for different household types. Bernheim and Scholz argue that, for college graduates, the hypothetical and actual profiles are pretty similar, but that for individuals without college qualifications, saving rates are well below (less than half) those required for the LCH consumption smoothing property to be satisfied. The paper concludes that many Americans do not save enough for retirement and that policy interventions should be designed to raise personal savings.

Other evidence supports the proposition that consumption drops on retirement, in apparent contravention of the LCH (Banks, Blundell and Tanner, 1998). There are a variety of possible explanations for these findings on consumption adequacy, including an *a priori* rejection of the LCH, an emphasis on the disincentives to save for low earners such as asset tests in income maintenance programmes, the existence of capital gains, assumption concerning retirement behaviour and a variety of technical objections to the methods of calculation.[12] Nevertheless, the presumption that low earners will never save enough for retirement has implicitly been accepted in many choice-based pension systems, which allow and indeed encourage low earners to remain within the existing system.[13]

Evidence from the UK concerning those who have opted out of the supplementary pension programme in order to buy a Personal Pension (an individual retirement saving account) also makes somewhat dispiriting reading. Of those in full-time employment, around a third made no additional contribution to their Personal Pension on top of the rather small rebate paid automatically by the government.[14] Interestingly, younger workers are more likely to make an extra contribution than older workers (Disney, Emmerson and Tanner, 1998, Table 2.4). Table 2 looks at the magnitude and persistence of these additional contributions to Personal Pensions over the years 1992 to 1995. Those who contribute more infrequently do not contribute more, and average amounts contributed to the pension, as a percentage of salary, are not very large.

Table 2 Level of additional contributions made to personal pensions in the UK, by persistence of contribution.

No of periods contributing, 1992 to 1995	Amount (£/month) averaged over 4 years	Amount (£/month) averaged over periods contributing	Amount (% of salary) averaged over periods contributing
1	11.31	45.26	4.8
2	31.90	63.80	5.3
3	39.90	53.21	4.3
4	61.70	61.70	4.3
No. observations	266	266	218

Source: British Household Panel Survey, 1992-95, Disney, Emmerson and Tanner (*ibid)* Table 2.6.

The issue of participation in schemes versus contributions to schemes is also highlighted in the experience of Latin American pension 'privatisations'. In countries such as Argentina and Chile, the number of individuals affiliated to these schemes has increased dramatically. Even when contributions are notionally mandatory, however, the rate of growth of *contributors* has generally been rather slower. Barrientos (1998), for example, argues that in Chile, the proportion of the labour force contributing to the new scheme of individual retirement accounts in the early 1990s was still lower than the proportion contributing to the old, unfunded, scheme in the late 1970s. The proportion of affiliates that actively contribute to the new pension plans fell from 73% in 1982 to 44% in 1997 (*ibid*, p.171). This may, of course, have something to do with the changing composition of affiliates over time, but there is still a puzzle as to why so many people 'slip through the net' in a supposedly mandatory contributory scheme. Possible reasons include individual transitions between employment, unemployment, inactivity and the informal

economy. Barrientos's regression analysis also suggests that non-contribution is associated with working in temporary jobs, low hours of work, less skills and small working establishments. Of course, many of these characteristics are also typically associated with non-participation in existing, unfunded, social insurance programmes.

These findings are mirrored in other countries in Latin America. Furthermore there is some evidence of inconsistent individual investment decisions in developed and less developed countries alike. Again, taking the UK case of Personal Pensions, the charging structure of such accounts is typically front loaded in the form of brokerage commission. Yet, according to the Personal Investment Authority (1997), of those Personal Pension plans taken out in 1993, around 30% appear to have lapsed by 1996.

6 Evaluation and conclusions

What can we learn from all this? There is clear evidence that countries with more generous public pension schemes have historically had less private provision. The key question is whether, as public pension programmes come under pressure, private retirement saving can fill the gap. The paper looked at three interrelated questions. It suggested that there is evidence of substitution between pension wealth and private saving but that there were difficulties in utilising existing studies to ask whether cutbacks in public programmes would generate extra saving. The 'experiment' of the 1992 pension reform in Italy did however give some grounds for suggesting that there might be a positive private saving response.

The second question raised was whether the 'right' people responded to incentives to take up private, funded, retirement savings programmes when these became available. Again, the evidence from the UK, Latin America and the transition economies that had enacted reforms of this kind suggested that individuals were able to differentiate the incentive structures of different types of plans sufficiently well to make sensible choices.

The third, most problematic question was, where individuals shifted from public unfunded programmes to private, partly voluntary, retirement saving, is there evidence that individuals saved 'enough' for retirement? If 'enough' was defined in terms of lifetime consumption-smoothing with an exogenous retirement age, then the US

evidence suggested that saving might be inadequate, although the degree of 'inadequacy' remains contentious. Similar findings from the UK suggest that many people who have partially opted out of social security in order to buy individual retirement saving accounts are not doing enough saving. Finally, there was evidence that in countries with significant privatisations, many members of the new funded scheme were, for one reason or another, not contributing and therefore presumably not accumulating pension rights in retirement.

These last points suggest that reforming governments have to mandate adequate rates of contribution to funded schemes, and to monitor carefully scheme participation. Here there is a dilemma for governments that see a transition to a funded pension strategy simply as a means of lowering mandatory contribution rates to pension programmes. Given that existing unfunded liabilities still have to be financed, the trick lies in persuading individuals that contributions to funded retirement saving accounts, even if mandatory, are not to be seen merely as another 'tax'. Government must also give clear directions as to why a certain level of contribution is necessary to sustain a certain standard of living in retirement. It is clear from the studies discussed here that individuals do respond to incentives, but transitions from costly unfunded pension programmes to schemes with a greater private component should not be treated as an easy option.

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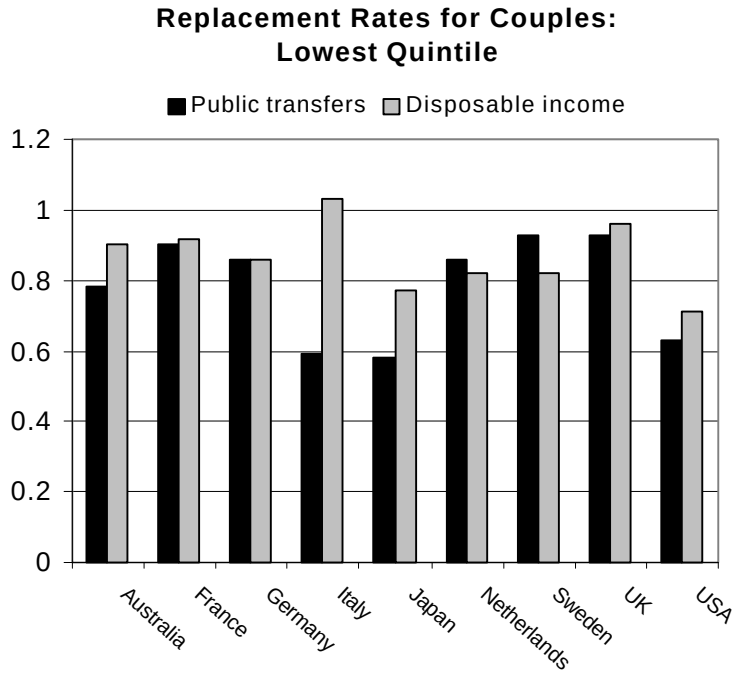
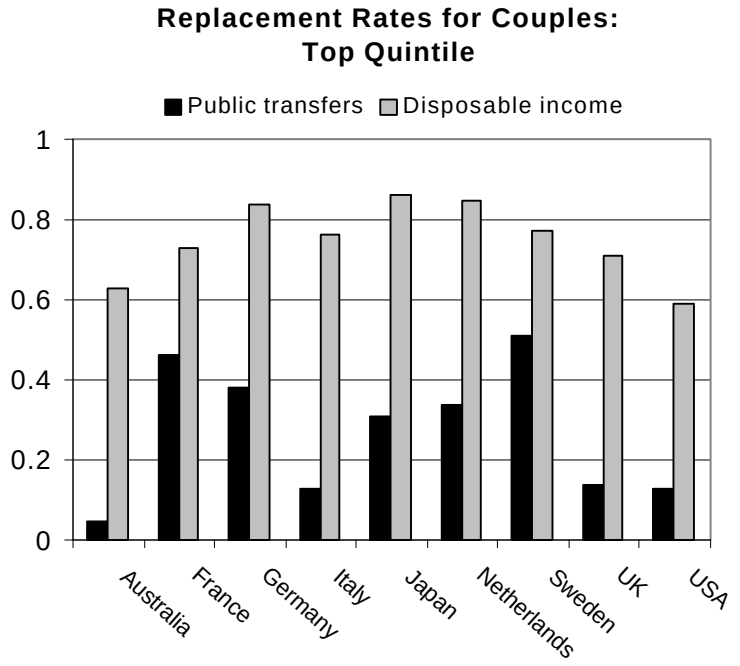
Figure 1





Notes:
Gross public transfers to households with head aged average 67 relative to *net* income of households with head aged average 55.
Net (disposable) income of households with heads aged average 67 relative to disposable income of households aged average 55.
US estimates have been adjusted from Disney *et al* (1998) to allow for direct taxes on a comparable basis. Households aged average 55 may not be employed (this is especially relevant in Italy, and for the lowest quintile). For other *caveats*, see Disney *et al (ibid).*

Figure 2

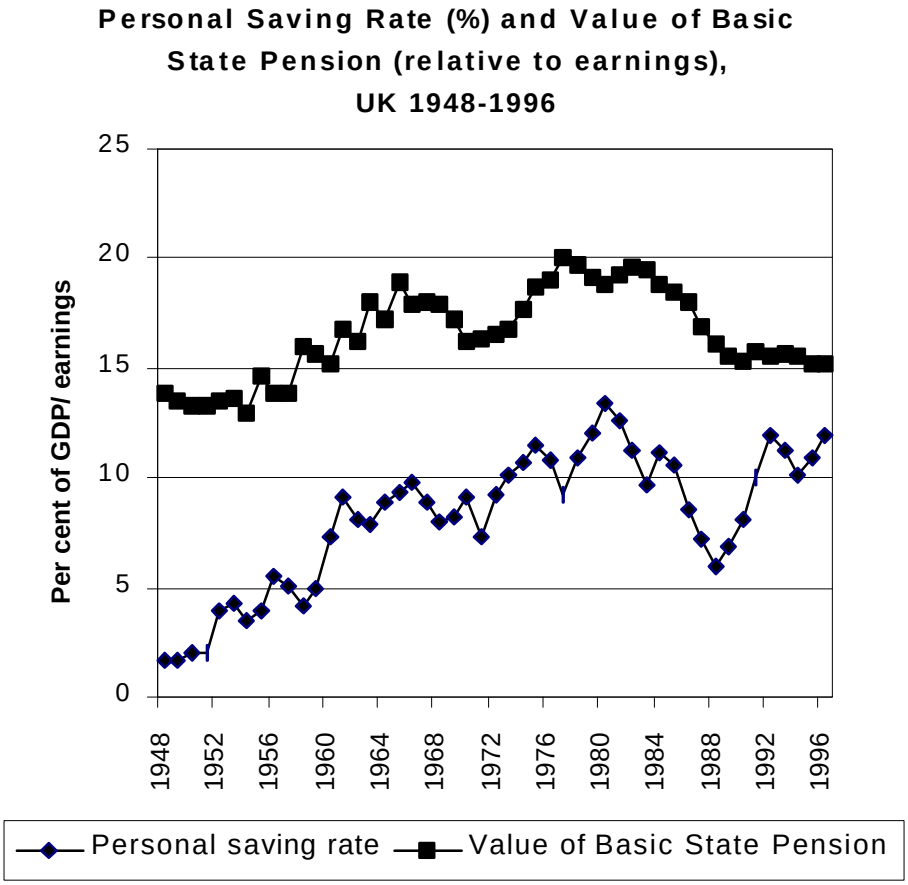


Figure 3
Italian pension reform: implied offset of pensions on private saving, by age
Source: Attanasio and Brugiavini, 1999

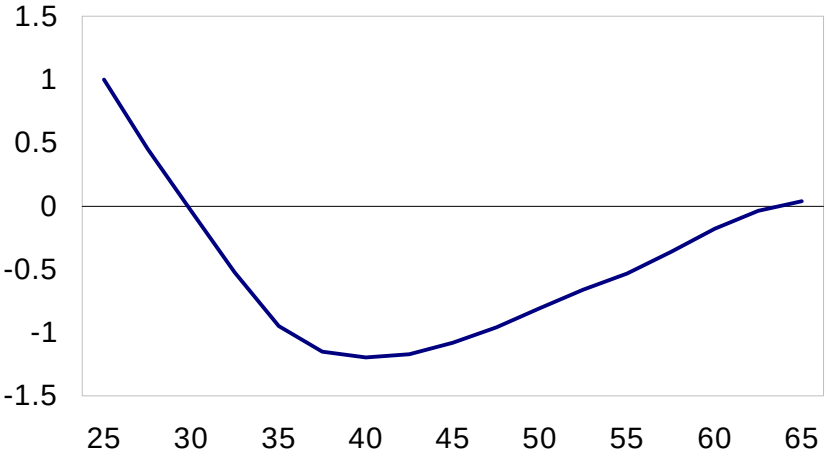
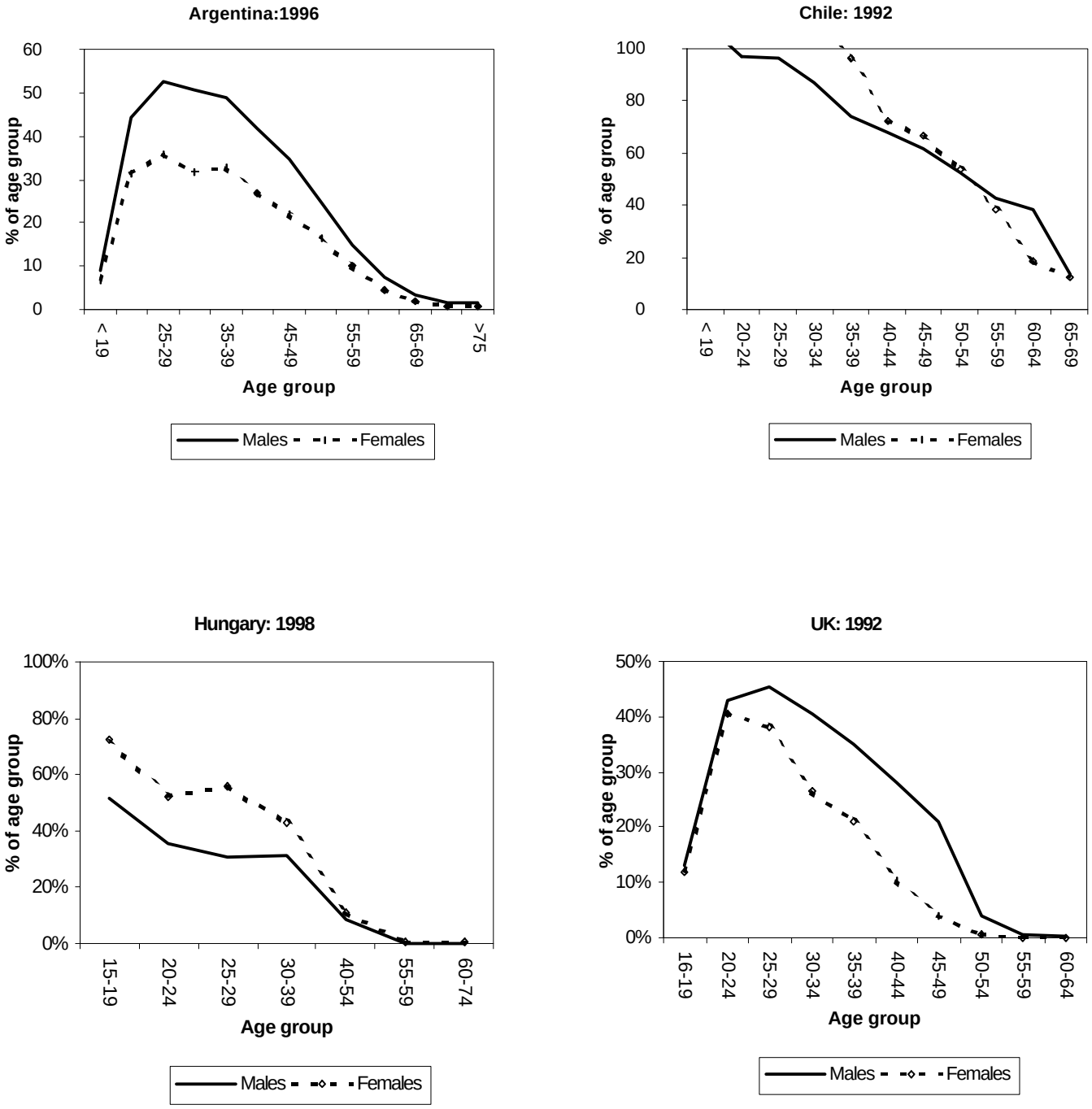


Figure 4

Proportions of individuals switching to individual DC plans: by age, selected countries



Source: World Bank data, Disney *et al* (1994) and Disney, Palacios and Whitehouse (1999).

Footnotes

[1] Although of course some generations must inevitably lose out if they have to finance their own retirement as well as finance the public pension liabilities of earlier retirees.

[2] There is an enormous literature on this issue: see, for example, Attanasio and DeLeire (1994), Engen *et al* (1994, 1996), Poterba *et al* (1995, 1996).

[3] For ease of interpretation, a double log specification of pension assets and GDP is adopted. Countries with zero reported assets are assigned a small positive fund (there are always some funded schemes in the banking sector, for example).

[4] This has been a central argument of the saving and growth theme in Latin America: see, for example, Edwards (1996) and Hausmann and Reisen (1997).

[5] Although there are of course strong disincentive effects of income maintenance programmes: see Feldstein (1987) and Hubbard, Skinner and Zeldes (1995).

[6] This may be a result driven by the particular data set used, which suggests a high reported amount of 'employment and self-employment' income among older households in Italy. This may be because a different definition of 'household' was used in Italy in this study compared to the more common tax or 'benefit' unit used in the other countries. The evidence for Italy provided in Johnson (1998) suggests that Italy has a public-private 'mix' much closer to the French and German model.

[7] There are many such studies for the United States and others for European countries. Useful recent surveys of past estimates include Engen and Gale (1997), Gale (1998), Gustman and Steinmeier (1998) and Blake (1999).

[8] This goes back to the original Feldstein (1974) article. Similar approaches have been adopted in the UK by Browning (1982) and in Italy by Rossi and Visco (1995).

[9] Typically the components of wealth on the RHS of an equation of this type form a sub-cointegrating vector. Thus any arbitrary renormalisation of the vector will produce a different set of coefficient estimates – the sub-cointegrating vector should instead be treated as a simple, aggregate, variable.

[10] For an extensive discussion of this point, see Disney and Whitehouse (1992), Palacios and Whitehouse (1998), and Disney, Palacios and Whitehouse (1999).

[11] The rebate rises with age, of course, because the cost of purchasing an annuity varies according to the age at which the fund commenced. These numbers take account of projected loading charges, which are at least 1 percentage point of the total. It should also be noted that the majority of optants are young, as described in the previous section.

[12] Gale (1997), for example, argues that Bernheim's calculation overstate the deficit by first deducting all other pension flows in retirement. Suppose for example, an individual currently with 100 units of consumption expects to receive 60 units of pension income and has saved enough to generate 15 units of investment income. The Bernheim 'adequacy' measure is calculated as 15/(100-60)=40%. A simple consumption 'replacement rate' is (60+15)/100=75% which sounds much less worrying, especially after account is taken of work-related expenditures etc. which are no longer required after retirement.

[13] For example, *Partnership in Pensions* consultative document issue by the UK government in 1998 proposed to upgrade the supplementary public pension programme for low earners, to be known as the 'Second State Pension', while higher earners were encouraged to contract-out of the public programme into a private, funded, scheme.

[14] See Disney, Emmerson and Tanner (1998), who utilise four waves of the British Household Panel Study 1992-95 to obtain this finding.