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Save As You Go or Pay As You Go?
The age old policy debate

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Preface

Susan St John's 2004 doctoral thesis examines the retirement of middle income baby-boomers and analyses integrated reforms to managing the risks of longevity. For an overview, see:

> Managing the risks of ageing: the role of private pensions and annuities within a comprehensive retirement policy for New Zealand. For the full thesis, available in three parts, see: *Part 1, Part 2, Part 3.*

While there has been remarkably little change to New Zealand's basic universal pension since this thesis was written, the debates around how policy *should* change have been intense. One of the critical debates is about the future role of KiwiSaver and its integration with New Zealand Superannuation (NZS). For example, Andrew Coleman, a Motu and Treasury economist, has written at length about the need to change from a Pay As You Go (PAYG) to a Save As You Go (SAYG) approach for the state pension, using arguments drawing on rates of return and intergenerational equity.[2]

In 2012 the Financial Services Council, the representative body for financial services including KiwiSaver and life insurance providers, produced a report suggesting that "under very conservative assumptions, saving is likely to be at least 60% more efficient than taxation funding for retirement incomes".[3] Further, at the long-term fiscal projections conference, *Affording our future*, held 10-11th December 2012, Sir Michael Cullen proposed reducing future spending on NZS to zero by a switch to more SAYG KiwiSaver funds.[4]

In the 2004 thesis, Part 2 asked: "What can the economics of insurance, pensions and annuities offer the policy debate?" This working paper reproduces Chapter 7: "The economics of pensions" as a contribution to the ongoing discussions as to whether New Zealand should rely more on SAYG and less on PAYG. It provides a critical look at some of the models that have been used extensively in policy debates elsewhere and in New Zealand.

While it is difficult to fit a social insurance scheme such as NZS into the context of the overlapping generations model and the related discourse about rates of return, this has not prevented analysts from attempting to do so. Also, at times, there has been an uncritical acceptance of the suitability of these models for policy purposes, compounded by policy objectives that are often unclear, obscure or conflicting, and neglected normative issues.

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[2] See for example: Coleman, Andrew. 2011. "Mandatory Retirement Income Schemes, Saving Incentives, and KiwiSaver," Motu Note #6, Motu Economic and Public Policy Research, Wellington; Coleman, Andrew. 2011. "Behavioural Economics: Implications for the Savings Literature," *Motu Note* #7, Motu Economic and Public Policy Research, Wellington.
Coleman, Andrew. 2011. "PAYGO v SAYGO: Prefunding Government-Provided Pensions," Motu Note #8, Motu Economic and Public Policy Research, Wellington ;
Coleman, Andrew, 2012, *Intergenerational Equity and Public Policy,*Long term Fiscal Projections conference, http://www.victoria.ac.nz/sacl/about/cpf/events/affording-our-future-conference-2012/paper.

[3] See the report: *Pensions for the Twenty First Century: Retirement Income Security for Younger New Zealanders* at: http://fsc.org.nz/site/fsc/files/reports/FSC_Pensions%20report%20%20FINAL%20Publication%2017%20June%202012%20copy.pdf.

[4] Cullen, Sir Michael, 2012, *The Political Economy of Long-Term Fiscal Planning from a Social Democratic Perspective,* Long term Fiscal Projections conference, http://www.victoria.ac.nz/sacl/about/cpf/publications/pdfs/2.3-Cullen-paper.pdf.

Debates over SAYG pre-funding versus PAYG, defined benefit versus defined contribution, private versus public delivery, have not delivered clear answers. This working paper argues that the goal of a socially optimal distribution between generations at a point in time (intergenerational equity) has been confused with returns to the individual (individual equity). The latter approach stresses actuarial fairness so that each generation does not get more pensions than they themselves have 'paid for'. This belies concepts of generational interdependence and intergenerational and intragenerational equity that may be more appropriate.

The key message in this working paper is that any enquiry into welfare enhancing pension reform *cannot* avoid distributional value judgements. To be sustainable, reforms should be flexible in the light of uncertainties surrounding migration flows and economic conditions. Most importantly, reforms must meet agreed criteria of equity, efficiency and administrative simplicity.

Apart from the simplicity of NZS, one of the advantages of the New Zealand's age pension design and delivery is that there is no residual value to be appropriated to an estate in the case of death, and there are no messy issues around spousal pensions and divorce. There are changes that are needed to maintain fiscal sustainability but when judged, not against the goal of actuarial purity, but against the goal of securing a reasonable standard of living for all older people, the New Zealand basic pension is a highly cost-effective scheme.

Comments are welcome to Susan St John: s.stjohn@auckland.ac.nz.

Dr Susan St John Michael Littlewood

April 2013

Managing the risks of ageing: the role of private pensions and annuities within a comprehensive retirement policy for New Zealand

Part II: What can the economics of insurance, pensions and annuities offer the policy debate?

7. The economics of pensions

7.1 Introduction

This thesis argues that full protection against the risks associated with longevity has not yet been achieved in New Zealand. The hypothesis is that there is an important, unexploited role for annuities in pension policy. A new annuity product is proposed in Part III of this thesis that fits the character of New Zealand's unique retirement income policy framework.

It is important to establish first whether New Zealand's policy mix is fundamentally sound, or whether there should be more radical reform of its public/private pension system. Should the World Bank's advice to move towards privatisation and individual accounts be heeded so that New Zealand has a proper second pillar? This is tantamount to asking if a fundamental reform is necessary to take us closer to meeting agreed objectives in pension policy.

In political circles it is often implicitly assumed that pension policy impacts significantly on macro-objectives and can bring about enhanced national saving as a means of alleviating the burden on future workers as the population ages. But changing retirement income policies (for example, PAYG to funded, defined benefit to defined contribution, introducing tax incentives, etc) is not a magic wand that can solve the resource allocation problems posed by an ageing population. The quantity and quality of real goods and services available to be shared is the important factor (Barr, 1998, 2000, 2001).

Of course, in choosing pension design, it is important to not compromise other worthy often inter-related economic goals, such as growth and national saving. But there is little supporting evidence that a change in pension design in itself will favourably affect these macro-objectives. Thus while more saving by individuals for their retirement may be a good thing for them, and may be enhanced under one policy

rather than another, the overall macro outcome for national saving may be little affected.

The demographics show that the output currently produced by every five people of working age must be shared with about one retired person. In thirty years however, the output of every five people of working age will have to be shared with just over two retired persons. The economic implications are clear, unless the pension policy itself causes a growth of the economic pie, the pain of the ultimate resource division between young and old remains unchanged. The source of claims on output, be it from private pensions, social security or past savings is not particularly important. Growth may help by making the absolute sacrifice of the working age population less painful, but if relative living standards are to be maintained, growth alone does not affect the necessary division into sevenths rather than sixths.

The argument is *not* that growth is unimportant. But in developed countries there is little empirical evidence that growth of the economic pie can be increased significantly by policy changes in pensions. For a beneficial impact to occur, first more national savings actually have to be generated. There is no point in increasing household saving if its price (tax incentives for instance) has an offsetting impact on government saving. Similarly subsidising one form of saving such as pension plans, may simply cause a shift of household saving into the preferred saving vehicle and may actually decrease household saving as the individual saving goal can now be reached with less effort.

Even if total saving arising from pension privatisation is higher, this increased saving does not guarantee growth. Nor does it guarantee either more or better investment. If investment opportunities are available it is not obvious that they require the prior act of saving in order for them to be exploited.[5]

Yet despite these arguments, most official commentaries (for example, OECD, 1998; World Bank, 1994) stress the need to reduce the public component of retirement incomes and advocate various degrees of privatisation and prefunding. The implication is that this type of reform will resolve the extra pressure on resources implied by an ageing population. But as Barr points out, privatisation of an unsustainable public pension system does not change anything; the only gains will come from reducing the generosity of pensions. Suitable reforms to the public scheme, without privatisation, might also achieve this end. Perhaps privatisation is the vehicle for making such reductions more acceptable, but privatisation itself may present a raft of other problems for society including higher administration costs.

Pensions policy is fundamentally a mechanism to facilitate a sharing of current output among the economically active and the retired. Thus policy design must reflect the appropriate distributional goals to be achieved and the ultimate value judgements about equity behind these. Is individual equity to be prioritised, with the notion of fairness revolving around actuarial purity? Generational equity, as followers of this approach have dubbed it, implies that each generation should pay for itself and thus

[5] For an expansion of these ideas in the New Zealand context see St John and Ashton (1993). A recent commentary by the New Zealand Treasury on this theme has asserted that the concern about low national saving is misplaced. Growth requires investment but low national saving is not necessarily a constraint if these investments are to be made (Claus, Haugh, Scobie & Törnquist, 2001).

get its just deserts (Williamson, Watts-Roy & Kingson, 1999). If, on the other, hand the goal is more equality between young and old, male and female, rich and poor, communitarian or collective objectives stressing interdependence and fairness at a point in time will be dominant. This approach is less encapsulated in a single catchword than is the case for the generational equitists. Following Williamson et al (1999), terms that are likely to be used are 'intragenerational equity', and 'generational interdependence'. The term *intergenerational equity* will also be used in this chapter to mean fairness in experiences and living standards between the old and the young.

The discourse around pension policy is likely to reflect the dominant cultural values of the particular country. Thus the proponents of privatisation of social security in the US who argue for generational equity are having success, precisely because they tap into deeply held American mores of self-help, thrift and self-reliance (Williamson et al., 1999). In New Zealand, on the other hand, while a moralistic streak can also be traced back to the 19th century the emphasis for most of the 20th century has been on more communitarian and collective values. These values are reflected in a strong 'generational interdependence' endorsement of wider concepts of equity, including gender equity, poverty prevention rather than mere alleviation, and the need to allow for 'participation in and belonging to' society rather than mere subsistence living.[6]

In spite of the rise of Rogernomics from the mid-1980s which reactivated the older emphasis on self-reliance, thrift, choice and free markets, radical proposals to reform the state pension towards more 'generational equity' have failed abysmally. The first of these attacks on the basic values underpinning the New Zealand model for pensions came in 1991 as the newly elected right-wing government attempted to make the state pension a welfare benefit. The second attack came in the form of the 1997 referendum for an effective privatisation of the state pension defeated by an overwhelming majority (92.8 per cent) of voters).[7] It is therefore unlikely that the values that drive the US debate are as relevant to New Zealand.

7.2 Dependency models

Much of the policy literature concentrates on the impact of ageing and the so-called burden of dependency. Simple models look at how the cost of the economically inactive is borne by the economically active, while sophisticated variants tease out conceptual issues associated with measurement. For instance, what does it mean to be economically inactive? How does unemployment affect dependency? How will ageing affect the 'burden'?

These models highlight the implicit distributional problem: the share of output enjoyed by the old is not available for the young. Manipulation of the parameters such as age of entitlement to a state pension, the level of pension and the indexation formula can, in theory, bring about a shift in the burden borne by the working age

[6] The Royal Commission on Social Security in New Zealand (1972) provided an important foundation to debates around equity by endorsing the concept that everyone should have enough income to be able to 'participate in and belong to' society.

[7] The Retirement Saving Scheme (RSS) would have been a replacement for the state pension not a supplement to it (St John, 1999b).

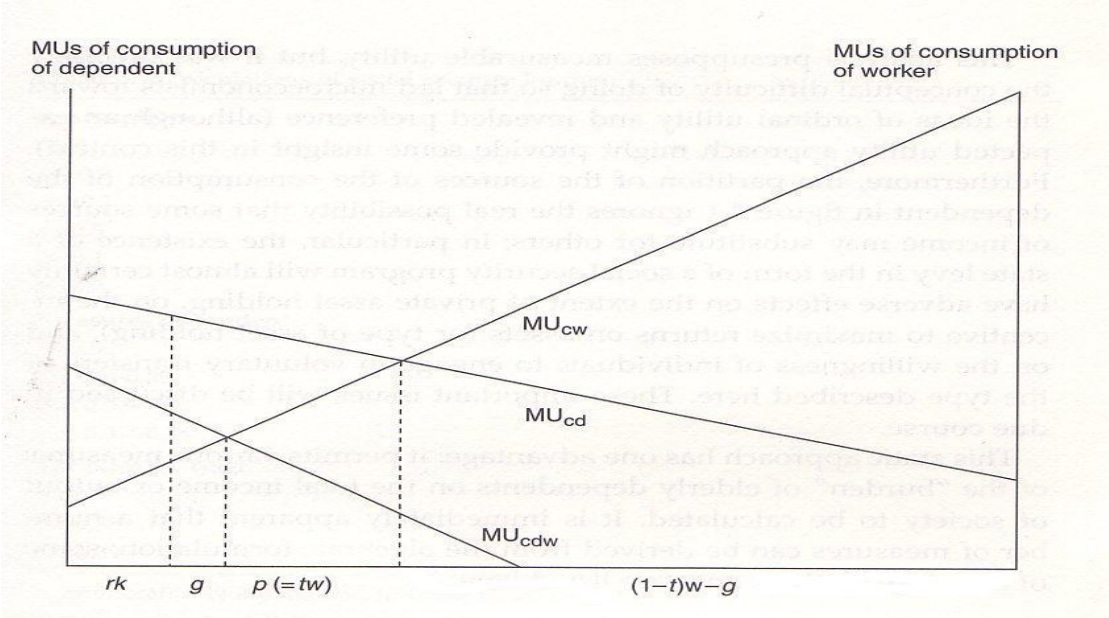
population. This may be deemed necessary in light of the ageing of the population, indeed many countries are adopting this approach.

The question remains: is there a distribution of output between the old and the young that is optimal? What are the criteria of an optimal distribution? Is the optimal outcome obtainable given real world political institutions? Any investigation into improved pension design has an overarching normative dimension; implying that there may be an optimal incidence of the burden of ageing. Clearly value judgments cannot be escaped when attempting to address these issues.

For instance, a utilitarian optimum distribution is one that has as its aim the maximisation of total utility. To make this operational, interpersonal comparisons of marginal utility (MU) of income are required, necessitating cardinal measures with all the associated problems such a methodology entails *(Disney, 1996, p.20).*

In the utilitarian model, each worker (of *L* workers) produces output *w* and each dependent (of *D* dependents) has assets k, giving rise to a claim on output *rk*, where *r* is the rate of return. The total income to be shared (Y) can then be expressed as $Y = Lw+Drk$. Workers and dependents each face diminishing MU from extra consumption but they may have different utility functions reflecting different marginal utilities at each level of income as shown below in Figure 7.1. To simplify the analysis, Figure 7.1 assumes that $L = D$, and the income to be shared between a representative worker and a dependent is therefore $w+rk$ (horizontal axis).

Figure 7.1: Optimal redistribution



Source: Disney1996, p. 21

This model requires that marginal utility of consumption for the worker as given by MU_{cw} and the marginal utility of the dependent, MU_{cd} are equated in each period. In a voluntary regime, presuming that workers care about the utility of retirees, the MU that the worker derives from the dependent's consumption can be illustrated by $MU_{cdw.}$ The worker's utility is maximized where $MU_{cdw} = MU_{cw}$, implying gifts of value g will be transferred to the dependent. To maximise *social utility,* further

transfers are required which may take the form of a pension *p* paid for by tax *t* on wages, that is $p = tw$. Hence the worker would have consumption claims of $(1-t)w-g$ and the dependent, claims of $kr+g+p$ as shown on the horizontal axis in Figure 7.1.

Even if, in theory, an optimal outcome can be found, it is far from clear that real world decision-making rules will produce the desired result. There is no benign omniscient mastermind that can guide decisions to achieve the 'Nirvana' of welfare maximising theory even if utility was capable of being measured cardinally. Moreover, there is a strong implication that for maximum welfare all real income should be equalised. Unfortunately, this has powerful effects on incentives and significant implications in terms of work and output.

Alternative value judgments about various income distributions may be based on Egalitarian or Rawlsian principles. In an egalitarian approach, redistribution may be judged desirable well beyond the point at which the economic pie starts to shrink as a result of the disincentives implied by such redistribution (Atkinson & Stiglitz, 1980, p.342). This is because a high weighting that the egalitarian approach assigns to the value of equality. On the other hand, a Rawlsian approach would emphasise the position of the least well-off, and only sanction distributions that maximise the welfare of that person (Stiglitz, 2000, p.102). In such an approach it is unlikely that universal pensions such as New Zealand Superannuation could be justified. There is no compelling reason as to why a universal payment to well-off over 65 year olds is necessary to enhance the position of poor families. [8]

In light of the unsatisfactory resolution of many of these normative issues,[9] much of the literature instead concentrates on a dynamic concept in which interpersonal comparisons are not needed. Individuals have a lifetime budget constraint and are assumed to choose outcomes that are preferred over time, and are hence optimal compared to other states. Unfortunately, achieving Pareto Optimality, even if real world decision-making allows this to occur,[10] does not answer the question of whether distribution between individuals and generations is in some sense 'fair'. Disney (1996, p.14) notes:

> *...by eschewing interpersonal and intergenerational welfare comparisons, economists cannot provide clear answers as to what policies are 'best' for society.*

7.2.1 The burden of dependency

There are numerous ways to conceptualise the dependency of older people but this so-called 'burden' is often misunderstood and oversimplified.[11] Crudely, using the model discussed above illustrated by Figure 7.1, access to resources by the old is acquired by pensions, gifts and income from investment. Pensions of value *p* for each pensioner are paid for by the working age population's taxes (at cost *pD* where *D* is the size of

[8] Except perhaps to spare the poor the stigma of the means test, and to save costs of administration.
[9] This thesis argues that the normative element must not be avoided.
[10] Disney (1996, p.285) also comments: "Although economists have tried to specify mechanisms (such as 'policy rules') that might sustain intertemporal optimising behaviour, no government has yet been prepared to relinquish the notional freedom associated with policy discretion and with the accommodation of interest groups".
[11] As Disney (1996, p.23) says "Intertemporal and inter-country comparisons are often highly misleading".

the dependent population). Direct gifts are of average value *g* and income earned on capital stock *K* is *rK* where *r* is the rate of return.
Following Disney (1996, p.22), with average wages *w*, working age population L, and assuming the capital stock *K* is held only by the dependent population and all income and transfers received by the old are spent on output, one measure of the burden *B* of retirees on current output is given by:

$$B = \frac{(p+g)D + rK}{rK + wL} \qquad 7.1$$

If equation 7.1 represents a socially optimal distribution as well as the actual burden, the implication is that income from capital and gifts alone would not have sufficed.
Disney hints that forced transfers, *pD*, may provoke intergenerational conflict. In practice, if workers are compelled to pay taxes to fund pensions, they will feel their utility is not maximised and may retaliate by cutting back on gifts. Not discussed by Disney is the possibility of bequests or transfers from the dependents to workers. If pensioners do not find their pensions and voluntary transfers from workers satisfactory, they are likely to draw down their past savings, at least to the extent that they have assets, and to the extent that mechanisms exist for them to realise those assets. The net result is one of lowered bequests and changes in asset prices, which effectively reduce the potential consumption of workers, regardless of whether they approve or not.

One of the conceptual problems therefore not incorporated into this simple model is the notion of expectations of rights to a certain level of consumption by the old. This expectation is likely to reflect each cohort's experience. It is not unlikely that the excessive expectations of the baby-boom cohorts may be particularly problematic.
The 'burden' of dependents is expressed as a share of total output in Equation 7.1. But as Disney (1996) notes there are other possible representations of the 'burden', each with its own set of measurement issues.

The first measure is the public burden of pensions. This is the share of pensions in total income given by:

$$B_2 = \frac{pD}{rK + wL} \qquad 7.2$$

The tax rate *t* on wages needed to finance the pension is given by:

$$t = \frac{pD}{wL} \qquad 7.2a$$

The second measure is the replacement ratio R of the pension as a fraction of wages, The before tax ratio, *p/w*, becomes, *p/(1-t)w*, after taxes, *t*, needed to pay the pension, (assuming pensioners pay no tax).[12]

$$B_2 = \frac{p}{(1-t)w} \qquad 7.3$$

A third measure looks at the burden of dependents on workers. The simple case of the total burden including voluntary gifts is given by:

$$B_3 = \frac{(p+g)D}{wL} \qquad 7.4$$

[12] If, as in New Zealand and in most countries, pensioners pay expenditure taxes this equation needs modification (Disney, 1996, p.27).

Naturally equation 7.4 may also be considered in after tax terms. Thus the 'burden of intergenerational transfers' can be described and measured in a number of ways, but the literature around pension reform has largely focused on the tax burden on taxpayers or workers. Thus the replacement ratio, $R = p/w$, and the dependency ratio, D/L, are the critical variables with an ageing population. Rearranging equation 7.2a to reflect this emphasis:

$$t = R\frac{D}{L} \qquad 7.5$$

However the dependency ratio is a crude measure, implying populations D and L are discrete and separable. Modifications can improve the realism of the so-called 'tax burden' by identifying and including factors such as participation rates; sickness and unemployment rates.[13]

One of the most important factors driving costs is the replacement ratio p/w with many countries increasing this ratio over time and extending coverage. The combination of a rising replacement ratio and a rising dependency ratio is at the heart of concerns about the cost of the burden of ageing. Changing the dependency ratio with policies to encourage later retirement can modify the burden, as may indexation changes to lower the replacement ratio (Disney, 1996, p.27).

If indexation of the pension is linked instead to post-tax wages, and R^* is the desired replacement rate, then:

$$R^* = \frac{p}{(1-t-x)w} \qquad 7.6$$

In Equation 7.6, x is the tax rate needed to finance other government spending while, as before, t is the tax rate needed to finance pensions. The total cost of pensions for D *pensioners* pD, is paid for by twL. Thus, in equation 7.6, if p/w is replaced:

$$R^* = \frac{t}{(1-t-x)}\left(\frac{L}{D}\right) \qquad 7.7$$

If pensioners spend all their income and pay a value added tax on expenditure of rate v, the value of t can be correspondingly lower:

$$R^* = \frac{(v+t)}{(1-t-x)}\left(\frac{L}{D}\right) \qquad 7.8$$

Although this model is a significant development from the simple tax burden given in equation 7.5, this approach oversimplifies the reality of a world where a number of other factors are likely to operate. In the case of New Zealand, these considerations include:

- New Zealand Superannuation is paid for from general taxation not from a separate wage tax. New Zealand's income tax base is *all income*, not just wage income, and the Goods and Services Tax (GST) is levied on all expenditure, not just that paid out of wages and pensions.
- Income-earning assets are held by workers, as well as held by the retired.
- Tax rates are progressive, and the progression affects the tax paid by pensioners.

[13] Disney (1996, p.24) cites Falkingham in illustrating that demographic change is only one factor and does not necessarily drive dependency.

- The dependency ratio *D/L* is not immutable and is too crude. It is influenced amongst other things by retirement decisions and the availability of work for older workers.
- To the extent that retired people are living on their assets, they will be contributing more expenditure tax (also noted in Disney 1996, p.28).

In the New Zealand context, the rate of pension paid to everyone is 32.5 per cent of the net average wage (using the married rate of pension). Other benchmarks such as per capita GDP could also be used (St John & Willmore, 2001).[14] In this approach, each pensioner is provided with a pension, *py*, where *y* is per capita income and *p* is the fraction of per capita income to be provided. The cost for *L* pensioners is *pyL* and must be met by taxes.

If *t* is the tax rate as a fraction of national income *Y* then:

$$tY = pyL \qquad 7.9$$

Dividing each side by total population where *r* is the proportion of pensioners in the total population, equation 7.9 becomes:

$$t = rp \qquad 7.10$$

St John and Willmore (2001) show that for any desired universal pension for the retired, expressed as a fraction of per capita income, and a given proportion of retired people in the population, the tax rate *t* can be found. In the case of New Zealand, the pension rates as a proportion of per capita income are 0.315 for a married person and 0.41 for a single person.[15] The current proportion of those over 65 is 0.12 or 12 per cent. If the married person rate were paid to all, the tax rate as a percentage of GDP required would be found from:

$$t = rp = 0.12 \times 0.315$$

$$t = 0.0378$$

This suggests that the current *net* tax required as a proportion of GDP is around 4 per cent and will rise to just over 8 per cent as the dependency ratio rises to 26 per cent by 2030. Within the simplifications made this model conforms to expected outcomes.[16] Using a basic dependency model, the Periodic Report Group (1997) projected the *gross* cost of pensions (tax rate, *t*) as a fraction of GDP under different parametric assumptions as shown in Table 7.1.[17] The 'no change' gross costs of New Zealand Superannuation parallels the results from the model illustrated above.

Table 7.1: Future gross cost of New Zealand Superannuation with parametric reforms

NZS	Year					
per cent GDP	2000	2010	2020	2030	2040	2050

[14] The choice depends on which measure, wages or per capita GDP, best reflects the relative living standards objective of policy.

[15] The Periodic Report Group suggested there is little justification for a different rate for married and single persons. However a supplement to recognise the costs of living alone would still be needed if the single rate was aligned to the married rate (Periodic Report Group, 1997a,p.86).

[16] If the pension retains its relativity to per capita income, so long as per capita income is growing or stable, ageing need not impose additional burdens on workers (Willmore, 2001, p.9-10).

[17] The current long-term model (Woods, 2000) is found on the New Zealand Treasury web site, http://www.treasury.govt.nz/.

No change	4.8	4.8	6.4	8.5	10.1	10.5
Increasing Age[1]	4.8	4.8	5.5	6.2	7.9	8.4
Semi wage index[2]	4.8	4.8	6.2	7.6	7.4	8.0
Index to prices[3]	4.8	4.3	4.9	5.6	5.8	5.1
Targeting[4]	4.8	4.8	6.1	7.6	8.0	8.6
Scenario A Age and targeting	4.8	4.8	5.4	6.7	8.0	8.5
Scenario B Semi-wage and targeting	4.8	4.8	5.8	6.5	7.2	7.5

Source: derived from the Periodic Report Group (1997a)

Notes: 1.The age is raised from 65 to 68, beginning in 2015 and phased in over 12 years.
2. NZS is adjusted by the average of wages and prices in each year, until a floor for a couple of 50 per cent of net average earnings is triggered in 2050.
3. Adjustment only by prices.
4. Reductions achieved by targeting rise from 1 per cent in 2015 to 10 per cent in 2025, thereafter staying at 10 per cent of the gross costs.

The static dependency model takes the dependency and replacement ratios as given. In practice, growth of the population and/or of productivity will alter the dependency ratio over time. The economic burden of dependency as opposed to the demographically defined measure outlined by Equation 7.5 depends on what is happening to rates of growth in the population and labour force participation. Naturally, positive rates in either rate will lower economic dependency over time Disney (1996, p.30).

A dynamic model may be a more suitable framework for policy analysis of social security issues than the static model outlined in this section. The problem is that the growth rates are not independent and virtuous and vicious circles may arise. Thus falling population growth may enhance productivity or reduce productivity depending on the story you want to tell (Disney, 1996, p.41). For this reason the simpler model is more practical.

7.3 Overlapping generations models

Overlapping generations models are widely used and are based on Samuelson's seminal (1958) paper '*An exact consumption-loan model of interest with or without the social contrivance of money*'. The basic assumptions of Samuelson's model of the optimal allocation of consumption within and between periods are that:

- no goods can be stored: ie. capital accumulation is equal to zero;
- claims on consumption are discounted at a parametric interest rate (*i);*
- plans don't change and;
- each generation has the same preferences.

The standard model is set up so that each identical individual lives for three periods *j* = 1,2,3, working for the first two and retired in the third period. For simplification the length of the period is often taken to be the equivalent of a year in length and the realities of unpaid work and who bears the costs of reproduction are ignored. As one protagonist of the Samuelson model puts it 'Reproduction is exogenous and occurs through parthenogenesis' (Buiter, 1997, p.607).

The individual's utility is a function of total consumption in each period; $U = U(c_1, c_2, c_3)$, where lower case denotes per capita consumption. The model invokes the simplification that each individual must use the capital market to acquire a claim on resources in period three, hence:

$$s_1(i) + Rs_2(i) + R^2 s_3(i) = 0 \qquad 7.11$$

where $R = \frac{1}{1+i}$ and *s* is the level of savings.

Allocation of consumption among the three age groups at any point in time is given by: $C_1 + \frac{C_2}{(1+\eta)} + \frac{C_3}{(1+\eta)^2}$

For total net *(S)* for all generations at any point in time to equal zero, with an interest rate i, and the rate of population increase η:

$$S_1(i) + \frac{S_2(i)}{(1+\eta)} + \frac{S_3(i)}{(1+\eta)^2} = 0 \qquad 7.12$$

The individual's allocation of saving over three periods (equation 7.11) and the in-period requirement that net savings of all three generations alive is zero (equation 7.12) can be reconciled if the interest rate is equal to the rate of population increase, that is: $i = \eta$. Thus equilibrium implies that the rate of interest is equal to the rate of population growth.

The critical insight provided by Samuelson is that a 'social contract' between generations, whereby present workers finance the pensions of retirees in the belief that the social security system will treat them similarly on retirement, may achieve the desired equilibrium as long as the interest rate equals the population growth rate.
The contract however is threatened if the rate of population growth is falling or stagnant. In such a case some generations will have to accept a lower, even negative rate of return on their contributions or may force unsustainable pension commitments. Public choice theory suggests that each generation will always try to pass excess commitments on to the next generation. Indeed the evidence suggests that this has happened in PAYG social security systems as populations have aged, giving rise to the view that such schemes are in essence 'Ponzi' schemes.

Much of the literature since Samuelson has attempted to address the limitations of the standard overlapping-generations model. The legacy of assumptions inherited from Samuelson of consistent life time preferences (no myopia); no changes in output (constant productivity) and no storable output (zero capital stock) are discussed in Disney (1996, p.41-50).

Aaron (1966) extends the model to incorporate the possibility of real wage growth ω, rewriting equation 7.13 as:

$$S_1(i) + \frac{S_2(i)}{(1+\eta)(1+\omega)} + \frac{S_3(i)}{(1+\eta)^2(1+\omega)^2} = 0 \qquad 7.13$$

Thus, ignoring cross products, equilibrium then implies that $i = \eta + \omega$. Aaron builds on Samuelson's observations and concludes that "…social insurance can increase the

welfare of each person if the sum of the rates of growth of population and real wages exceeds the rate of interest" (Aaron 1966 cited in Disney, 1996, p.43). However as Disney notes (p. 43) there is an apparent paradox in claiming that:

> *... if a person saves in a funded scheme the present value of his pension (benefits net of contributions) will be lower than if he belonged to a PAYG scheme at any given rate of interest. (p.43)*

The reason is that the PAYG scheme pays the pensions to the current smaller retired generation, while the funded scheme is to pay for the identical pensions of the larger current generation. The social contract works for PAYG so long as each generation is larger than the preceding one. Thus workers are better off with unfunded PAYG schemes rather than a fully funded scheme "...so long as the return on social security is at least equal to the sum of population growth and real productivity growth rates" (Disney, 1996, p.50).

The conclusion drawn from this relatively simple model is that only if the real rate of interest exceeds the sum of the population and wage growth, will a full pre-funded pension system be preferable to a PAYG one (see section 7.4.3). Critically however even this ignores the transitional costs of a change to a pre-funded scheme.

7.4 World Bank model

Based on the Samuelson model, it appears that PAYG financing is relatively more costly than funded, defined benefit approaches under certain assumptions about interest rate and wage increases. Following this approach, the World Bank (1994) have strongly suggested that countries review their generous PAYG public sector schemes and adopt a three pillar approach, with a second pillar of mandatory saving managed by the private sector.Developing countries, after establishing a minimum Pillar I to meet the poverty objective, should also be looking to mandate a private saving scheme for Pillar II.

The model set out briefly below is found in *Averting the Old Age Crisis* (World Bank 1994, pp. 297-302). In the PAYG scheme a worker is provided with a proportion of final gross salary indexed to average wage rises. Again for the PAYG scheme:

$$t = B\frac{D}{L} \qquad 7.14$$

Where the replacement ratio, $B = \frac{p}{w}$, is fixed, w equals the average wage, and t is the contribution rate necessary to achieve the pension outcome.[18] In contrast to this simple exposition, if a worker funds his/her own pension he/she must contribute tW in the first year, where W is the starting wage. Wages and contributions grow at the rate of $(1+g)$ each year and the capital accumulates at $(1+r)$ each year of a working life of n years. The period in retirement is an average of m years. The years of retirement/years of working, m/n constitutes the passivity ratio.

Making the simplification that r equals g, the lifetime capital accumulation on retirement must equate to the present value of pension payouts over m retirement

[18] The World Bank use $C = WD$ where C is the contribution rate and D the dependency ratio. This section uses common symbols for continuity with the rest of the chapter.

years. Assuming *r*, *g*, *n*, and *m* are constant over time the value of the accumulated capital, $tW(1+g)^n n$ must be equal to the present value of pensions $BW(1+g)^n m$. The required contribution rate can therefore be expressed:

$$t = B(\frac{m}{n}) \qquad 7.15$$

If $r<g$ then *t* must be higher than $B(m/n)$. If $r>g$ then *t* will be lower. Intuitively it is clear that if interest rates are lower than wage rate growth, then a high contribution will be required. Lowering the passivity ratio, *m/n*, though say raising the retirement age will lower the required contribution rate. The World Bank rather bluntly concluded that:

- When the dependency ratio is the same as the passivity ratio and $r = g$ then there is no difference between PAYG and funding.
- If the rate of interest exceeds the growth rate *g* then funding is better than PAYG.
- If the dependency ratio is less than the passivity ratio, assuming $r=w$ m/n, as in a rapidly growing population, then PAYG is better than full funding.

The problem is that the dependency ratio can be higher than the passivity ratio with an ageing population. In an economy that is dynamically efficient, *r* should be greater than or equal to growth of GDP (which in turn reflects the increase in wages and population growth). Thus the World Bank (1994, p299) claims that full funding will be at least as cost efficient as PAYG and possibly more. They conclude:

> *Full funding costs less than pay-as-you-go (or yields a higher rate of return) if the interest rate is higher than the rate of wage growth plus the rate of population growth. If the interest rate is lower than wage growth plus population growth, the cost advantage lies with pay-as-you-go.*

While empirical evidence on wage growth and interest rates can be amassed, the case for fully funding pensions is far from convincing. PAYG, according to the World Bank, has an advantage early when the dependency ratio is smaller than the passivity ratio. The World Bank (1994, p.304) claims that as the dependency ratio approaches the passivity ratio, the influence of the higher return to capital reflecting its productivity, should dominate:

> *In sum, a cost advantage that pay-as-you-go plans might have had in the past was the result of demographic factors that no longer hold in many countries. In the future, if interest rates and earning growth maintain their relative positions and especially if pension funds are able to benefit from equity investments, capital mobility and international diversification, a fully funded system will require lower contributions rates than a pay-as-you-go system to achieve the same pension benefits.*

Martin Feldstein, another influential voice in the call to privatise pensions, stresses the efficiency or deadweight costs of the extra tax burden implied by ageing under the US PAYG social security scheme (Feldstein & Liebman, 2001). He reviews the impact on national saving and concludes reforms are likely to have a positive impact. But the issue is controversial and the literature far from conclusive. The World Bank's analysis of PAYG versus fully funded pensions finishes with the throw away line: "and the winner is…" (p.302). There is little analysis of macro impacts and no

mention of the inevitable transition costs in a shift from PAYG to a pre-funded pension scheme.

7.4.1 Critiques of the World Bank model

The framework and the conclusions the World Bank reached in the 1994 study are vulnerable on several other grounds, especially if relevance is sought in the context of the New Zealand pensions system. Internationally, the World Bank prescription has provoked a number of critical reviews (for example Heller, 1998; P. Orszag & Stiglitz, 2001).

PAYG and pre-funded schemes are doing two different things. One cannot replace the other, or be taken out of context, unless the argument is about what should have been the case a long time ago when pension systems were first introduced. A PAYG scheme improves the utility of existing retirees at the time of its introduction, while a pre-funded scheme does not. There may be social equity and justice reasons, as there were in the 1970s in New Zealand, for improving the incomes of the retired at that time. Clearly the issue of whether this was a good thing or not is highly normative.
Orszag and Stiglitz (2001) identify ten myths surrounding the common interpretations of the World Bank's preferred approach. The macroeconomic myths surrounding the mandatory private saving second pillar are:

- individual accounts raise national saving;
- rates of return are higher under individual accounts;
- declining rates of return on PAYG schemes reflect fundamental problems and;
- investment of public trust funds in equities has no macroeconomic effects.

They caution against thinking that there is one single answer for all countries and conclude, after examining these and the other myths that:

> *…the debate over pension reform would benefit substantially from a more expansive view of the optimal second pillar, which should incorporate well-designed, funded, public defined benefit plans. Such a more expansive perspective would allow policy-makers to weigh appropriately all the trade-offs they face, including private versus public systems; prefunding versus not prefunding; diversifying versus not diversifying and defined contribution versus defined benefit pensions plans. (P. Orszag & Stiglitz, 2001, abstract)*

Barr (2000) explodes similar 'myths' in the pension debate. In particular he writes of the primacy of the need for good governance and that "..from an economic perspective the difference between PAYG and funding is second order, and the range of potential choice over pension design is wide" (Barr, 2000, p1).

7.4.2 Impact on saving

Many arguments for preferring pre-funded schemes come from presumptions about the impact on various savings measures (Orszag & Stiglitz, 2001). While the theoretical case can be made for funding increasing national saving, the empirical evidence is far less obvious. Hemming (1998) provides a useful overview of the vast literature on this issue. He claims that the case for a switch to funded schemes is far from convincing, and refutes the claim that funded schemes are superior in handling demographic and economic risk. Eddy and Gower (2000, p.22) provide some

evidence for Australia, where the introduction of the Superannuation Guarantee (SG) scheme might have been expected to increase private and national saving. They note that the expansion of compulsory superannuation in the last fifteen years of the 20th century did not result in a discernible lift in aggregate private saving, due at least in part to displacement of other kinds of saving. They query whether the SG will deliver the rise in national saving that has been projected for the next 20 years of 4 per cent of GDP. They suggest that many of these offsets may prove larger than has been assumed.

It is often claimed that the introduction of PAYG schemes reduced national saving. Despite the logic of the argument, the empirical evidence is far from convincing (World Bank, 1994, p.301-310). The reasons why the facts don't fit the theory include the desire of the older generation to leave larger bequests (maybe in recognition of the higher taxes that the young are paying or will have to pay in the future); offsetting changes in transfers from children to their parents; and that higher earners may not have faith they will get pensions and save anyway.

The World Bank does argue, however, that the introduction of full funding is likely to have a beneficial effect on saving. Among the explanations is the 'recognition effect' whereby the compulsory scheme raises the awareness of the importance of saving. The theory in this case is somewhat supported by empirical evidence (World Bank, 1994, p.209), Nevertheless, the World Bank (p.309*)* wisely concludes:

> *...if the policy goal is to increase saving, pension policy needs to be accompanied by other measures - for example, keeping inflation under control, increasing the availability of safe instruments for saving, discouraging consumer borrowing, and possibly providing tax incentives to long-term savings such as taxing real rather than nominal returns.*

The transition from PAYG to full funding, a painful one for the current working generation, is largely ignored in the 1994 World Bank report. As Orszag and Stiglitz (2001) claim, ignoring the administrative and transition costs makes simple rate of return comparisons misleading. Transfers will still need to be made to the existing retired population (for example for social equity and justice reasons), and this could be interpreted to mean that the current generation of workers must 'pay twice', as they are forced to fund their own pensions as well. Interestingly though, in the case of the Chilean experience, the dissaving required by the state to pay off the old social security debt did not significantly offset the rise in private saving from the compulsory scheme.[19]

In the case of the compulsory Retirement Saving Scheme (RSS) proposed for New Zealand in 1997 (see St John, 1999b, 2001c), offsetting tax changes were required so that workers could afford to pay their contributions. These tax reductions would have meant higher taxes elsewhere, lower government spending or lower total public saving. In this New Zealand experience, the conclusion that introducing a pre-funded scheme averts an increase in required contribution rates arises only in the absence of macroeconomic considerations in the analysis.[20]

[19] Other factors were also at work and the economy was growing rapidly in any case.

[20] Similarly the push to introduce individual accounts in the social security trust fund in the US is based on a misunderstanding of the overall macroeconomic impact as opposed to how the accounting looks. The key point is that there is no free lunch (P. Orszag, 2001).

Once the baby-boom generation draw down their funds in retirement, the saving deficit will still need to be filled by either increased contributions or more saving. This could mean either higher contributions paid by workers to reduce consumption or higher public surpluses. Either way the burden on the current workers is not alleviated.

7.4.3 Rate of return arguments

Inescapably, the ultimate selection of a theoretical approach involves value judgements about equity objectives a previously discussed. Pensions have a range of possible objectives, one is fairness based on actuarial purity, another is redistribution to allow for participation and belonging or poverty prevention, another is income smoothing over time, yet another is to increase national savings and improve growth.

A critical preoccupation of the literature has been with how PAYG schemes redistribute across generations. The traditional way to determine net redistribution is to look at the expected present value of benefits less the present value of contributions for each generation and from that work out a rate of return. Negative redistribution is implied by a rate of return less than the market rate of interest. This is often accompanied by the implication that alternative investments would make the investor better off. Usually net rates of return are calculated for groups of people, cohorts, males, females, etc., and show the first generations under a PAYG scheme are advantaged compared to subsequent ones, with little redistribution from rich to poor within generations.[21]

Rates of return discussions are frequently obscure with few writers spelling out clearly exactly what they mean. Settergren & Mikula (2001) provide a welcome exception. They attempt to remedy what they have seen as a deficiency in the literature.

> *The aim of this paper is to present a method to calculate the rate of return and the internal rate of Pay-as-you-go systems. After that is done it may still be claimed that the growth in the contributions base is a good approximation of the rate of return. We would largely agree with that view. However in this case for once in the social sciences - being more meticulous makes the understanding and analysis of the studied system not only more correct but also easier. (Settergren & Mikula, 2001, p 2)*

Drawing on the overlapping generations literature, they model a mature system in which each identical individual is expected to live for three periods (years), working in the first two and retired in the third when a pension of 50 per cent of the average wage is paid. The rate of return, if growth is zero, is also zero, as it is with the Samuelson model.

[21] The better-off enter the workforce later, and pay contributions later. They may gain from the ceiling on contributions and they live longer in retirement and enjoy earnings-related pensions longer. Also there is very often a significant redistribution to women at home in the social security formula for pensions. There is a 50 per cent bonus on pension for a spouse with a wife who was not in the paid labour force. Most often, the spouse of a poor person must work outside the home so that it is the wealthy who can afford stay-at-home wives are rewarded in the public pension system.

If a population growth rate of 100 per cent is assumed, the population structure is 4:2:1 with six people of working age paying the pensions of one old person. There are six people of working age for every one retired person so that to provide a pension for that one retired person of 05*w* the workers must each contribute 0.*833w*. The pension each individual receives on retirement of 0.5*w* is the total return on the contributions made in periods one and two, where r is the rate of return on those contributions. Settergren & Mikula show that the total return is 200 per cent, and the annual rate is 100 per cent as is found by solving the quadratic equation:[22]

$$0.5 = (0.833)(1+r)^2 + 0.833(1+r)$$

ie. $r^2 + 3r + 4 = 0$

By taking this very simple approach, Settergren & Mikula (2001) show that the rate of return on contributions in a PAYG scheme is not always the same as the growth in the contributions base, but depends on the way in which wages are apportioned between cohorts one and two, and on mortality patterns.

Following the Settergren and Mikula, Table 7.2 sets up a simple overlapping-generations model in which the average wage, *w*, is assumed to grow at ω per annum, in a steady state population. There are assumed to be three identical individuals alive who each live three periods of equal length, working in two of these and retired in the third, when they each get 0.5w. The PAYG scheme is funded by a 0.25 payroll tax.

Table 7.2: Rates of return with wage growth

Period	Payment to the PAYG scheme	Payment to the PAYG scheme	Pension received
1	Individual 9	Individual 10	Individual 11
	$0.25w_1$	$0.25w_1$	$0.5w_1$
2	Individual 8	Individual 9	Individual 10
	$0.25w_2$	$0.25w_2$	$0.5w_2$
3	Individual 7	Individual 8	Individual 9
	$0.25w_3$	$0.25w_3$	$0.5w_3$

Source: based on Settergren and Mikula (2001)

Thus $w_2 = w_1(1+\omega)$ and $w_3 = w_1(1+\omega)^2$ and ω is the rate of wage growth. The rate of return to individual 9 is given by the solution to:

$$0.5(1+\omega)^2 = (0.25)(1+r)^2 + 0.25(1+\omega)(1+r)$$

It can be seen that if ω is 10 per cent then *r*, the rate of return is also 10 per cent. Consequently it is tempting to conclude that the rate of return on social security is equal to the rate of wage growth in a static population. And, if the population growth rate is η, then the rate of return will be given by $\eta + \omega$.[23]

However this overlooks the fact that the model is highly simplistic. Just how rates of return are to be measured in a world of non-equal individuals, whose longevity is changing and whose individual experience with the labour market is so different, is hard to see. Settergren & Mikula examine rates of return when wages are not earned

[22] The root of negative 4 is taken to be irrelevant.
[23] Ignoring cross products.

evenly in the two work periods, and show that rates of return can differ from the growth in the wage base.

The simple model set up in Table 7.3, assumes that there is a one-off improvement in longevity in period four, while the pension rates stay the same. The rate of return of individual 10 improves dramatically. Not until we reach period 7 do the rates of return stabilise. Individual 10's rate of return is found from solving

$$0.5(1+\omega)^2 + 0.5(1+\omega)^3 = 0.25(1+r)^3 + 0.25(1+\omega)(1+r)^2$$

Table 7.3: Rates of return with improved longevity

Period	Payment to the PAYG scheme	Payment to the PAYG scheme	Pension received	Pension received
1	Individual 10	Individual 11	Individual 12	
	$0.25w_1$	$0.25w_1$	$0.5w_1$	
2	Individual 9	Individual 10	Individual 11	
	$0.25w_2$	$0.25w_2$	$0.5w_2$	
3	Individual 8	Individual 9	Individual 10	
	$0.25w_3$	$0.25w_3$	$0.5w_3$	
4	Individual 7	Individual 8	Individual 9	Individual 10
	$0.5w_4$	$0.5w_4$	$0.5w_4$	$0.5w_4$
5	Individual 6	Individual 7	Individual 8	Individual 9
	$0.5w_5$	$0.5w_5$	$0.5w_5$	$0.5w_5$
6	Individual 5	Individual 6	Individual 7	Individual 8
	$0.5w_6$	$0.5w_6$	$0.5w_6$	$0.5w_6$
7	Individual 4	Individual 5	Individual 6	Individual 7
	$0.5w_7$	$0.5w_7$	$0.5w_7$	$0.5w_7$

Source: based on ideas of Settergren and Mikula (2001)

But what is the reality of individual 10's apparent high rate of return?[24] He has had to live an extra period and his average discounted living standard in retirement does not improve. He may have money in the second period of retirement, but he is no better off than he was in the first period of retirement, he has just lived longer. The unrecognised issue in the traditional rates of return literature is that it is *relative living standards that are important, not rates of return.*

In period 4, individuals 7 and 8 pay an extra 0.25 per cent payroll tax. They have gained from wage growth compared to individuals 9 and 10, but that gain is overtaken by the impost of the extra 0.25 per cent tax.

Living standards of workers in period three are based on 0.75 w_1 $(1+\omega)^2$. In period four, workers' living standards fall to 0.5 w_1 $(1+\omega)^3$. If there is no growth at all, ω=0 then this is a fall in living standards of 33 per cent. To compensate, the rate of increase in wage ω needs to be 50 per cent.

This extreme example is instructive in showing that a one-off increase in the period spent in retirement of 100 per cent requires a 50 per cent annual rise in wages to maintain living standards in the model. If longevity is improving more slowly than wage increases or productivity then living standards may be maintained for workers as well as the retired and may even rise.

[24] If ω=10 per cent, the rate of return in this example is approximately 40 per cent.

It is important to look beyond the confines of an over-simplistic model however. It might be concluded that individuals 7 and 8, faced with the prospect of living longer should save for themselves. If new payroll taxes of 0.25 per cent are put aside in private accounts, not only will this not be enough compounded at $r = \omega$ (because individuals 7 and 8 now also live a longer time in retirement), but somehow additional taxes will have to be raised to pay for individual 10 in his second year of retirement, if he is to be supported at all. In period 5, individual 9 will also require a pension for the additional year.

7.4.4 Discussion

While these models are helpful in understanding where some of the statements in the literature come from we do not live in a world where any of the assumptions hold.

Notably:

- Individuals are not identical.[25] Workers have a spread of earnings around the average wage, and hours of work and years employed vary significantly.
- Many working age women are employed in the work of reproduction which is invisible and uncounted.
- Individuals do not all live the same period of time in retirement but have a distribution of probability of death around the average.
- Living standards matter, not rates of return.

Clearly we need to take into account a greater spectrum of experience than may be possible while keeping the model tractable. For example, a more accurate picture can be drawn by distinguishing four distinct classes, i.e. those with:

- Low average earnings while in periods one and two, low longevity (many lower socio economic men and women).
- Low average earnings while in periods one and two, high longevity (many women).
- High average earnings while in periods one and two, low longevity (bad luck).
- High average earnings while in periods one and two, high longevity (many men).

In contrast rates of return studies generalise for all ‘workers’ and mask what is really going on. The World Bank study, for example, reports rates of return were higher than 15 per cent for workers retiring in the 1950s and 1960s, 8 per cent for those retiring in the 1970s but only about 2 per cent for workers retiring after 2000. Significantly, the inference is that these rates were less than these workers could have got from other investments (World Bank, 1994, p.134).

There is a strong sense of a lack of actuarial fairness:

> *In the Netherlands, Sweden and the United States, workers retiring in the first thirty years of the public pension scheme received large positive lifetime*

[25] The use of the masculine pronoun is appropriate as these models are somewhat irrelevant for women. They take no account of the work of reproduction or caregiving or the separate needs of women in retirement including their greater average longevity.

transfers, whereas many workers retiring in the future will get less than they would from other investments and will suffer negative lifetime transfers. (World Bank, 1994, p.2)

The observed fall in rates of return largely arise from three sources:

- The high rates to the first generations reflect their less than full contributions.
- The change in demographics.
- Policy changes which diminish generosity, such as raising the age of eligibility and changes to the indexation formulae.

The particular formula used to determine the final pension under different PAYG social security schemes determines the rates of return for each of the different groups identified above. Those with high average earnings while in periods one and two, and high longevity will generally do much better than those with low earnings and low longevity. The favoured group will be largely high-earner, long-lived men and their spouses. Ironically it is this group with the most to gain from privatisation of the PAYG system, while the losers will be those who live a long time and have a low lifetime earnings history (a group in which women are disproportionately represented).

Rates of return studies, in turn, paved the way for the development of generational accounts as discussed below in section 7.5.These accounts attempt to quantify the benefits and costs for each generation (for example Auerbach, Ghokale & Kotlikoff, 1994; Kotlikoff, 1992). A question addressed in this thesis is whether a generational accounting approach to fairness is useful, or whether the static concepts of fairness at a point in time, between the young and the old, male and female, are more relevant.

In the case of New Zealand the rates of return analysis is not readily applicable as discussed below in section 7.7.1. The source of revenue for financing New Zealand Superannuation is not only tax on wages, but includes taxes on investments earnings and taxes on expenditure including those paid by the retired themselves. The basis for entitlement to the flat rate pension in New Zealand is not contributions, as in social insurance PAYG schemes, but the simple one of residency. Therefore relating tax contributions to pensions paid is not just difficult, but conceptually meaningless especially for those who have never worked or even paid tax.

In the case of New Zealand, the first generation of retirees that received National Superannuation certainly received a boost in their living standards. Looking back, the portion of taxes paid by many recipients for social security would have been relatively miniscule. Yet, they can be viewed as being compensated for the sacrifices and taxes that they paid to build New Zealand's infrastructure and bring her successfully through the depression and war years. In accepting the validity of such arguments, this thesis argues an equity-based approach is the appropriate one as elaborated below in section 7.5.

7.4.5 The costs of pre-funded pensions

The World Bank and other similar models, in concluding that the shift to full pre-funded arrangements is optimal, specifically assume that actuarial pensions will be paid once private funds have been accumulated, thus failing to account for real world

market failure problems in private annuity markets as discussed in Chapter 8. The pensions paid from pre-funded private schemes compared to pensions from a New Zealand style public PAYG scheme will always be at a disadvantage:

- They will incur much higher administration costs and overheads including the need to generate a profit.
- If there is unanticipated wage growth, or inflation, or risky investments that collapse, pre-funded schemes will find it difficult or impossible to meet expectations (for example of wage-related, real pensions).
- The macro implications of the transitional period may require offsetting policy changes, such as offsetting tax cuts to pay for increased contributions as in the 1997 Retirement Saving Scheme, (RSS).[26]
- There is likely to be pressure for all or part of the private pension to be inherited on death, reducing the ability of the scheme to spread the risks from those who live a short time in retirement to those who live the longest, (see, for example, the debate over the RSS in New Zealand St John, 1999b, 2001c).
- The distributional implications are in the direction of more, not less inequality as there is a close link between contributions and benefits. This link may or may not lead to less tax evasion than under a PAYG scheme.
- The recognition of unpaid work is impossible without a government contribution (unpaid work recognition is implicit and fundamental to the existing New Zealand public pension system).

The assumption therefore of a costless annuitisation process that could approximate the pensions from a PAYG scheme is not justified. If the aim is to save costs by reducing total pensioner claims, then privatisation may be a way to do it, but the same ends might be more simply and less expensively achieved by parametric changes to the PAYG system itself.

7.4.6 Protection from demographic risk

The argument that a PAYG pension backed by a social contract is less secure than a pension scheme with asset-backing is a seductive one and underpins much popular anxiety about the need for pre-funded pensions. Thus it is thought that while a future generation might refuse to pay social security contributions under the social contract, pensioners' assets in a funded scheme would be inviolate. But the reality, as discussed in the introduction to this chapter, is that the cost of pensions and the burden on workers is determined by the pensions that have to be paid out and not by the way in which they are financed. Under the ageing scenario, a smaller working age population must reduce its consumption if a larger retired population is to consume more. Under PAYG the per capita demands of the retired can be reduced if workers refuse to pay higher taxes or contributions. But under a funded scheme a similar effect is possible.

[26] A shift to personal accounts does not diminish the burden on workers as they will have to honour the unfunded commitments to existing and future retirees. The argument that the issuance of special recognition bonds etc overcomes this problem as outlined by Feldstein (2001) is fallacious (Mitchell, 2001, p.4).

Workers may force employers to pay them higher wages, reducing profits and dividends. If the proportionately fewer workers are only persuaded to purchase assets from the 'Fund' at depreciated prices, pensioners' expectations from the pre-funded scheme will not be met. The perception of what is happening, might in this latter case be less clear:

> *...both PAYG and funding are exposed to demographic risk, and in both cases this risk will ultimately be born by pensioners. However the extent that this burden is more explicit with PAYG - and there is an obvious sense in which this is so - then the potential for intergenerational conflict may be greater than with funding. (*Hemming, 1998, p.12*)*

7.5 Generational equity and generational accounts

In light of the inconclusive resolution of the macroeconomics of the funding versus PAYG dilemma, attention has focused on issues of generational equity in PAYG schemes. This is reflected in an extensive literature on generational accounts (for example, Auerbach et al., 1994; Gokhale & Kotilkoff, 1999; Kotlikoff, 1992).
The idea of generational accounts is based on two strong premises. The first is that there should be some kind of fairness across generations, where fairness or *generational equity* specifically means each generation pays for itself without imposing costs on other generations.[27] The second is that the government's fiscal accounts as they are commonly structured are not a good guide to the impact of current policy on the burden bequeathed to future generations. Kotlikoff (1992), for example, claims that government accounts are in fact meaningless.

Generational accounting is supposed to remedy the deficiencies of conventional budgets by taking a comprehensive view of income, assets and liabilities. The fundamental relationship is that the government's net financial liabilities plus its future consumption must be covered by the sum of the generational accounts of all existing and future generations. The net present value of taxes paid and transfers received by different generations over their remaining lifetime is calculated, using various assumptions about the discount rate and productivity growth.

Generational accounts have recently been composed for most OECD countries including New Zealand (Auerbach et al., 1997). In essence, the main point of comparison is between today's newborns and all newborns of future generations. Given changes in policy will affect the accounts of different generations differently; generational accounts allow the winners and losers to be identified. These accounts are based on the life cycle consumption model and income smoothing over time, and assume that the government has an 'intertemporal budget constraint' (Auerbach et al., 1997). Thus, future generations must pay for the fiscal excesses of today's generations.

As observed above, generational accounts have been compiled for New Zealand, but their use appears to be in abeyance. The original study by Auerbach et al., (1997), commissioned in 1995, found that, in marked contrast with other countries for which accounts have been compiled, New Zealand alone was not imposing a fiscal burden

[27] The term 'intergenerational equity' is reserved in this thesis to mean fairness between generations at a point in time.

(taxes paid less benefits received) on future generations. The study assumed the prevailing fiscal policy and the requirements imposed by the Fiscal Responsibility Act would be maintained. These assumptions thus implied that the budget would remain in balance and, if necessary, taxes would rise to achieve this, while the surcharge on New Zealand Superannuation would remain in place.[28]

As the New Zealand Treasury was at pains to point out, the finding could *not* be interpreted to mean that "New Zealand's current superannuation system, is sustainable into the indefinite future", or to imply that "…the higher tax burden on future generations is bearable in an absolute sense" (Treasury, 1997, p.2).
In some quarters, for instance, Banks & Emmerson (2000, p.8), there has been effusive praise for generational accounting:

> *There is no doubt that it is the right way to think about the aggregate implications of government pension policy and the potential effects of reforms.*

Yet, while generational accounts may indeed be useful where there are gross imbalances, such as was found to be the case in the early studies on the US, there are numerous caveats that make them difficult to interpret. A note of caution is sounded by Barr (2001, p.109) for example, who points out that seeking the goal of generational equity in the sense that net tax burdens should be equalised across generations entails a strong value judgement:

> *…a range of exogenous inequities - wars, natural disasters, major epidemics, the Great Depression, the collapse of communism - have generation specific effects: it is by no means clear that equalizing tax burdens is the equitable solution.*

Another important issue raised by Barr (2001, p.109) is that even if each generation is in balance the issue of how individuals within specific generations fare is not:

> *…with generations of varying sizes, equal treatment of generations by definition means unequal treatment of individuals and vice versa.*

Some critics are even more sceptical. Buiter (1997, p.606), for example observes disparagingly: "what prima facie they appear to tell us may be misleading and at worst quite incorrect". Buiter identifies three major problems with the technique. First, it depends on the strict life cycle model of household consumption. Once a bequest motive is allowed, and the possibility of imperfect capital markets accepted, generational accounts become far less easy to interpret. Thus transfers between generations can compensate for fiscal imbalances.

Second, even if the life-cycle model holds, the accounting framework is still not comprehensive enough to be meaningful. In particular, there is the intergenerational distribution of the benefits from the public provision of goods and services to consider and intergenerational externalities.
Intergenerational externalities are the external effects of the consumption, investment, R&D, production, resource extraction and human capital accumulation activities of current generations on the wealth and well-being of future generations (Buiter, 1997, p.623). Buiter's third, but most crucial criticism is the lack of allowance for general

[28] Since 1995, there have been major tax cuts, higher baseline spending and the surcharge has been removed.

equilibrium repercussions of alternative budgetary policies. Thus all tax-incidence or shifting issues are ignored but these endogenous changes are likely to be highly significant over time.

It is not unreasonable to conclude that generational accountants have been mesmerised by their own techniques and overly optimistic that accounting devices can illuminate real and complex issues. The net present value calculations of taxes and transfers are particularly sensitive to the choice of an appropriate discount rate and assumptions about growth. The failure to account for the benefits of investment in human capital, the environment and infrastructure, or any other non-monetary considerations, make the interpretation of these accounts especially problematic. This point deserves emphasis. Among many possible illustrations, a parent's investment in their children's education is treated as parental consumption in this accounting framework, underestimating the benefits to the next generation and overestimating the generational imbalance.[29] The implicit assumption is that the money spent on education of children is for the parent's own pleasure. Similar arguments apply to taxes for building of infrastructure, parks, and nature reserves.

The main reason for New Zealand's relatively good showing at the time of the Auerbach et al., (1997) study, is that instead of building up public debt, debt incurred in the past was being repaid, freeing future generations from the obligation to do so (Treasury, 1997). But where was the recognition that New Zealand *as a country* is seriously indebted and that repayment of foreign loans or repurchases of assets sold to foreigners requires the generation of current account surpluses? In other words, the model appears to only partially capture the New Zealand situation. If the government has an inter-temporal budget constraint, is there not also an inter-temporal country external budget constraint?

While generational accounts are an interesting idea, a proper balance sheet such as the New Zealand government has tried to develop under the GAAP rules, may have the potential to perform the same warning function as generational accounts. For instance the discounted contingent liabilities, which result from the interaction of pension promises and an ageing population, can be modelled with as much if not more instructive information to guide policy. The setting up of the New Zealand Superannuation Fund which was detailed in section **Error! Reference source not found.** has reduced the potential for the New Zealand system to perform this warning function. While the logic of the Fund suggests that the discounted liabilities of future pensions should be on the balance sheet, this is not part of the legislation (see for a discussion of this point New Zealand Business Roundtable, 2001).

A common misconception is that generational accounts compare the fortunes of different generations where a generation is the cohort born in a given year. In fact the accounts show the remaining net taxes for each generation alive from the year in question to expected time of death. It does not look back at past taxes and benefits. It is therefore doing something quite different to the intergenerational equity approach taken by those who have compared the equity of lifetime positions of different cohorts. For example, Thomson (1991) in 'Selfish Generations' describes generations

[29] I am indebted to Professor Larry Willmore, senior economic advisor to the UN for discussions on this point.

born in the 1920s, 1930s, and early 1940s as gaining vastly more from welfare state arrangements over their lifetime than their successors in subsequent generations will enjoy. He warns of the unpleasant possibility of "intensified social disintegration along age and generation lines" (p.2).

The so-called generational equity debate has the potential to become confusing. The concepts of generational, intragenerational and intergenerational equity are slippery and often used in different ways in different contexts. Williamson et al., (1999) unscrambled some of the confusing elements and terminology and have provided a useful account of the historical evolution of the debate.

In brief, Williamson et al., (1999) explain that 'generational equity' is a concept held by the conservatives who emphasise the merits of individualism, and believe that each generation should pay for itself without imposing burdens on others. The conservative view, reflecting the shift to the political right, has sought to undermine public confidence in the US public scheme and pave the way for funding cuts.

Liberals on the other hand have tended to minimise any so called generational inequity in order to avert cuts:

> *Of particular note was the efforts of conservatives to define the problem as a 'crisis' and for liberals to define it as a short-term funding problem. (Williamson et al., 1999, p.12)*

Arguments against the continuance of the US social security scheme in the 1980s stressed that while retired people get far in excess of their contributions, workers are paying more than they will ever get back. Legislative changes in 1983 include an increase in contributions, a projected raising of the age of retirement and a reduction in the generosity of indexation provisions.

In the 1990s, advocates of generational equity focused on the need for partial or full privatisation of social security to avert 'bankruptcy'. As discussed earlier, these concerns were driven by falling rates of return, which largely resulted from demographic change and a reduced generosity of future pensions.[30]

> *The discussion of very low (and sometimes negative) rates of return for later generations reveals one of the major reasons for the head of steam that has built up behind proposals to fund pensions in many parts of the world. When the return being earned on contributions to the PAYG system is so low, this cannot be a great surprise. (Johnson, 1999, p.25)*

Williamson et al., (1999, p.16) notes that the conservative rhetoric about the entitlement crisis afforded a convenient attack on a number of elements of the welfare state.

> *In short, the interpretative framework put forth by critics is that the purported entitlement "crisis" is a myth being advanced by conservatives seeking to reduce government spending on Social Security, Medicare and the American welfare state more generally.*

[30] Thus, in the case of the UK, rates of return studies show a progressive fall for new retirees, until after 2020 when the rates of return become negative (Johnson, 1999).

7.6 Intragenerational and intergenerational equity

Williamson et al., argue that because the term 'generational equity' has become associated with the more conservative interpretation, it is less useful from the liberal perspective. In general, while there is less coherence and agreement among liberals, their concepts stress *intragenerational equity* and *generational interdependence*.

The concept of generational interdependence encompasses the view that the interests of the old and the young are intertwined. In the conservative view, the current elderly are often portrayed as getting a larger share at the expense of the young. Thus the falling fortunes of children are contrasted with the 'greedy geezers' and images of the old consuming the young (Williamson et al., 1999, p.14).

Liberals, on the other hand, see pensions for the old as also good for the young who benefit from their financial independence and are relieved of the obligation to support their parents. The policy conclusion is not that there should be means-testing for the old so as pension benefits are paid only to the poor, or even affluence-testing which is also often advocated by the conservatives.[31] While liberals advocate redistribution from rich to poor, they tend to be deeply suspicious of all means-testing. Critically, the liberals fear not just the possibility that over time the definition of the affluent may widen to include many of the middle class, but also that the US contributory pension might become regarded as just a welfare benefit.[32] They also believe that the concerns about middle class capture of universal or non-means-tested pensions is misplaced, and that public schemes perform an important insurance role for the middle class. [33]

The concept of *intragenerational equity* is also important to the liberal position. This concept encompasses other forms of equity, such relating to age, gender, wealth, income and race but stresses the need for fairness among members of the same generation. In this thesis, the term *intergenerational equity* is taken to mean fairness between today's generations, namely the retired and the working age populations at a point in time. *Intragenerational sharing* of some of the risks of old age, such as increasing longevity and long-term care also improves *intergenerational equity* by lifting some of the burden off the working age population. More *intragenerational sharing* of the risks of old age underpins the suggested reforms to New Zealand retirement policies outlined in Part III of this thesis.

7.7 What is to be learned from the theoretical approaches?

The World Bank (1994, p 317) argued that PAYG schemes go through a lifecycle:

[31] The old age pension in Australia is a good example of how a means test can be designed as an affluence test to exclude only the better-off. The surcharge that operated between 1985 and 1998 in New Zealand is another example.

[32] This thinking explains in part why the Labour government has been determined to keep the New Zealand Superannuation pension as a universal payment. The problem as discussed in this thesis for a liberal point of view on this one is that universal pensions sit oddly in a welfare state that is otherwise tightly targeted.

[33] For a comprehensive review of the literature on middle class capture and its relevance to the debates in New Zealand see Bertram (1988).

- Stage one: Youth, accumulation, windfall benefits and low contributions rates;
- Stage two: Coverage expansion and rising contribution rates;
- Stage three: System maturity and the collapse of the pyramid scheme.

But does this justify the radical reforms the World Bank has so strongly advocated? As discussed in this chapter and as Barr (2001) makes clear, privatisation of an unsustainable PAYG scheme must also involve changes that make outcomes less generous, if there are to be any gains from privatisation. Rather than privatisation, PAYG schemes themselves can undergo parametric reform to make them sustainable as suggested, for example,by the Periodic Report Group summarized in Table 7.1.

Nevertheless, the World Bank cautions newly developing countries to learn from the experiences of the older developed countries suggesting that the deterioration in the financial condition of PAYG schemes in developing countries is likely to be more rapid than for OECD countries. But the kind of PAYG scheme envisaged by the World Bank (1994, p 317) is clearly of the old social insurance type, rather than the New Zealand variant.

> *Starting with limited coverage and gradually expanding it delay the reckoning, but this solution is regressive under a pay-as-you-go scheme, because the first workers covered tend to be higher- income workers whose generous returns are paid for by the lower-income workers who enter late.*

PAYG schemes do not have to be structured like this and the New Zealand model may be a good one for developing countries. New Zealand already satisfies the recommendation that large, positive contributions-related transfers to high-income retirees should be avoided, and conforms to the advice from the World Bank (1994, p.327) that:

> *In general, transfers can be made more equitable by using a very progressive benefit and tax formula in public pension plans, imposing a floor but no ceiling on taxable earnings, switching to general revenue finance once coverage is widespread, and using privately managed funded plans that make benefits contingent on contributions, to provide higher pensions to higher-income groups.*

It is true that one of the enduring themes of political questioning in New Zealand has been whether New Zealand should have a funded pension and whether there is a need for individual accounts. This debate is often confused, both as to objectives and as to just how different strands of policy are supposed to fit together. Thus, whether advocates of full pre-funding have Pillar I or a second supplementary Pillar II in their sights is often obscure.

In summary, the overlapping generations models reviewed in this chapter are highly simplistic and based on restrictive assumptions. They are also inconclusive and while based on simplifying assumptions they quickly become too complex to be of much use for informing real world policy decisions. Furthermore, if they are to be calibrated to a real world economy there are daunting data requirements. The degree of implicit, but controversial, normative judgements in these models and their failure to incorporate gender analysis also render them less useful to real world policy-making. As Disney (1996, p.49) notes:

Whether such equilibria are attainable when, for example, capital investment is driven by other autonomous factors is open to doubt … and the analysis of disequilibria and stability properties can get extremely complex.

One of the problems of changing to a funded scheme from PAYG is the double burden on the current generation. The simplistic recommendation to adopt full pre-funding of social security ignores this transitional cost. The size of the transitional cost, however, is real and must be offset against any discounted gains from such a shift. Once this is done, it is far from clear that recommendations to privatise social security can be justified.

Moreover, as discussed, the case for funding over PAYG on the grounds of improved national saving is far from clear on empirical evidence despite its theoretical appeal and advocacy by the World Bank.

If funding is a lower cost financing option than PAYG, if it results in more intergenerational fairness, if it can better handle demographic and economic risk, if it can more clearly signal future pension costs and if it is associated with high saving (or at least most of these things are true), then a case could be made for funding. However it is argued that funding does not have a clear advantage on these grounds, and the case for a shift from PAYG to funding is an uneasy one. (Hemming, 1998, p.5)

7.7.1 The influence of theory

It is clearly evident from the foregoing discussion that there is a vast literature on the economics of pensions. It is less clear that these theoretical and empirical studies have had any influence in actual pension reform decisions in many OECD countries[34]. For example, Banks & Emmerson, (2000, p.55) observe that this is particularly true for the UK, whereas in the US there is a lot of debate but little reform:

One striking feature of the evolution of the UK system over the last 20 years... is the number of reforms that have been introduced with little or no prior debate. All genuine economic analysis has been conducted after the reforms were implemented.

In the case of New Zealand, many reforms have been imposed with little warning let alone analysis. As discussed in Chapter 2 of this thesis, many of these 'reforms' in turn have been reversed, for example, the New Zealand Superannuation scheme of 1974, the surcharge introduced in 1985, the change of the pension to a welfare benefit in 1991 and the reduction in the indexation formula in 1998. It is fair to say that academic debate and the influence of economic models of the type described in this chapter has also been muted if not non-existent in New Zealand.

The models presented in this section have, nevertheless, been used extensively in policy debates elsewhere and their influence may be increasing in New Zealand. But, at times, there has been an uncritical acceptance of the implications of these models for policy purposes. This is compounded when the objectives of policy are themselves often unclear, obscure or conflicting and the normative issues are neglected. The goal of a socially optimal distribution of output between generations at a point in time

[34] The World Bank Model has, however been particularly influential in pension reforms in less developed and Latin American countries.

(intergenerational equity) has been confused with returns to the individual (individual equity).[35]

In the New Zealand context it is clear that it is difficult to fit a social insurance scheme such as New Zealand Superannuation into the context of the overlapping generations model and the related discourse about rates of return. This does not, however prevent analysts from attempting to do so. At a one day symposium on Retirement Income Policy (Wellington July 13, 2001), Professor John Rust was invited to present the opening paper in which he stated:

> *Economic theory suggests PAYG social security systems result in a) lower savings, b) higher costs and distortions relative to fully funded systems since the implicit return of PAYG (the sum of real wage growth plus population growth, approximately 2 per cent for New Zealand) is less than the real interest rate (5-7 per cent).*

The high real rate of interest in New Zealand likely to be related to the risk premium needed to attract international capital to pay for an imbalance in the external accounts and a monetary policy focused on keeping inflation low. It does not necessarily reflect genuine growth opportunities, suggesting caution is needed when drawing such conclusions.

Rust (2001) reported that the internal rate of return for average wage earners in the US from social security was only 2 per cent. He claimed it was even negative for high earners.[36] The clear inference was that people could do better investing on their own. Moreover in drawing conclusions for New Zealand he stated:

> *To the extent prefunding comes from increased tax contributions (as opposed to borrowing to prefund the pension liabilities) New Zealand will benefit from the higher compound returns on the trust fund portfolio as opposed to the less than 2 per cent rate of return on a PAYG system.*

But, as observed above, it makes little sense to talk about a rate of return in New Zealand's PAYG scheme.[37] Naturally, pre-funding the state pension has an opportunity cost of other uses of the funds, such as repaying public debt or reducing taxes. If people kept their tax money and invested it, 'New Zealand' may benefit to a similar extent. If New Zealand does opt for individual accounts, the underlying objectives of NZS would need to be radically changed.

Rust (2001) argues that individual accounts would be legally the individual's own property making it difficult for government to renege on its promises. For a supplementary scheme that tops up the basic pension, individual accounts are critical. But one of the advantages of the New Zealand approach, apart from its simplicity, is

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[35] This confusion has underpinned much of the debate about privatisation of social security, especially in the US. As discussed in this chapter, rates of return on social security contributions are supposedly low, maybe negative compared to sharemarket returns, and therefore individuals are presumed best to save for themselves.

[36] This is not true for single-earner couples in the US, due to the 50 per cent pensions bonus for the spouse. The widow also continues with her husband's pension.

[37] To reiterate, New Zealand Superannuation is highly redistributive, making the average rate of return an unhelpful concept. Those who pay no tax during their pre-retirement years can gain the equivalent in pension of several hundreds of thousands of dollars. The New Zealand system is not analogous to the US system.

that there is no residual value to be appropriated to an estate in the case of death, and there are no messy issues around spousal pensions and divorce. It is a highly cost-effective scheme if judged, not against the goal of actuarial purity, but of securing a reasonable standard of living for all older people.

7.8 Conclusion

While the extent of the international economics literature is impressive, the results from a policy perspective have proved largely inconclusive. Debates over funding versus PAYG, defined benefit versus defined contribution, private versus public delivery, have not delivered clear answers. As Banks and Emmerson (2000, p.55) suggest further academic research and model refinements are now showing 'diminishing returns to scale' and now the hard work of normative analysis is needed:

> *Ultimately, however, conditional on policy-makers' knowledge of pensions issues being at the frontier, many developed countries are at the point where value judgements need to be made in order to set the direction for policy on future public and private pensions.*

It is the lack of appreciation of public choice issues, and the failure to grapple with equity issues between the young and the old at a given point in time, that has rendered most pension models, and predictions from them inconclusive.

> *What is striking to a reader of these studies is the difficulty of making any conclusive assessment of the redistributional consequences of a public pension scheme, given the multiple perspectives that one can have on how to evaluate any redistribution that may occur. (Heller, 1998, p.24)*

Furthermore, an enquiry into welfare enhancing pension reform *cannot* avoid distributional value judgements. Heller (1998) suggests that redistributional issues must be considered at the outset in designing public pension scheme. In the terminology used by the World Bank, attention to Pillar I is crucial. Yet, as Heller, argues, the emphasis to date on Pillar II has left many Asian countries with primary pillars that are incomplete or non-existent and many of their elderly unprotected.

If our interest is improving retirement policies, what conceptual model should be used? This chapter has suggested that the models that stress actuarial fairness for all generations, or those that are based on concepts of 'generational equity', are not useful as a guide to New Zealand policy development. The concepts of generational interdependence and intergenerational and intragenerational equity, as defined in this chapter are more appropriate. The aim of policy for the retired should be to facilitate a fair sharing of resources both between young and old and amongst the old themselves. The achievement of this goal should be empirically evaluated, suggesting the need for comprehensive data on distribution and living standards.

The case for New Zealand to fundamentally alter its retirement policies, by shifting to full pre-funding away from PAYG arrangements as proposed by the World Bank, cannot be sustained by rate of return arguments or by generational equity arguments. This leaves parametric changes to the state pension and reforms to private voluntary savings arrangements. The Periodic Report Group (1997b) set out a suitable political framework for policy development in New Zealand, while an earlier report outlines the necessary parametric changes (Periodic Report Group, 1997a). Reforms must

meet agreed criteria, for example those of equity, efficiency and administrative simplicity. To be sustainable, they should also be flexible in the light of uncertainties surrounding migration flows and economic conditions.

Part III of this thesis discusses a range of suitable normative criteria that might be used in New Zealand case to guide future reforms. The concepts of *intergenerational* and *intragenerational* equity are crucial to this discussion.

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