POVERTY ALLEVIATION VERSUS SOCIAL INSURANCE SYSTEMS: A COMPARISON OF LIFETIME REDISTRIBUTION

Jane Falkingham
and
Ann Harding

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National Centre for Social and Economic Modelling

• Faculty of Management • University of Canberra •

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Abstract

Among other objectives, modern social security and taxation systems seek to redistribute income from those with high to those with low incomes and to reallocate income across the life cycle of individuals. While there are numerous studies of the extent to which these aims are achieved during a short period, such as a week or a year, there are almost no studies of the lifetime redistributional impact of tax and transfer systems.

In this paper, two broadly comparable dynamic cohort microsimulation models are used to assess the lifetime redistributional impact of the British and Australian social security and direct taxation systems. The analysis suggests that the Australian system, with its emphasis on poverty alleviation, results in greater lifetime interpersonal redistribution than the British social insurance-based system.

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General caveat

NATSEM research findings are generally based on estimated characteristics of the population. Such estimates are usually derived from the application of microsimulation modelling techniques to microdata based on sample surveys.

These estimates may be different from the actual characteristics of the population because of sampling and non-sampling errors in the microdata and because of the assumptions underlying the modelling techniques.

The microdata do not contain any information that enables identification of the individuals or families to which they refer.

Contents

1. Introduction

All modern social security systems serve two linked, but distinct, aims. On the one hand, they are an updated 'Robin Hood' mechanism for transferring resources raised through taxation from those with high incomes to those with low incomes — termed *interpersonal redistribution*. On the other hand, they are also intended to transfer resources from the time in life when incomes are relatively high to other times when the incomes of the same individuals are low — *intrapersonal redistribution*.

To date, most distributional analyses have focused on the first of these aims, largely consisting of studies of the annual net fiscal incidence of taxes and cash transfers (Central Statistical Office (UK) 1992; Harding 1984; Saunders 1984). These studies thus examine the redistributional impact of government during a short period such as a week or a year. However, a very different distributional picture emerges when the effects of social security and taxation are examined over lifetimes (Falkingham and Hills 1995; Harding 1993a; Nelissen 1993).

Social security systems can be broadly classified as:

- social insurance-based systems, where individuals secure entitlements to a range of income support payments because of their identifiable social insurance contributions while in the labour market; and
- social assistance systems, where entitlement to a benefit is based on citizenship rather than contribution, but where entitlement is subject to the imposition of income and assets tests and, frequently for those of working age, requirements to engage in job search and training activities.

In reality, few social security systems are purely insurance-based, most having some elements of social assistance to cover individuals who fail to meet the contributory requirements.

One might predict that a primarily social insurance-based system would lead to a higher degree of intrapersonal redistribution of resources over a lifetime and that a primarily social assistance-based system, with its emphasis on poverty alleviation, would result in a greater degree of interpersonal redistribution. However, some degree of convergence in the redistributional impact of different systems when looked at from a

lifetime perspective might also be expected. The 'insurance' principle leads, after the event, to *interpersonal redistribution*, as some will suffer the contingencies insured, such as sickness and unemployment, while others will not. Similarly, the length of retirement will vary because of different life spans. The 'social' insurance principle that contributions should not reflect risk, that 'none should claim to pay less because he is healthier or in more regular employment', also leads to interpersonal redistribution (Beveridge 1942, p. 13).

Likewise, recipients of income support payments under a poverty alleviation system may, when viewed across the life cycle, simply be receiving the taxes they had paid earlier. At any point in time, a large proportion of those with low incomes are retirees who might have enjoyed higher incomes in the past, or students who will probably earn much higher incomes in the future. Social assistance schemes therefore implicitly reallocate income over the life cycle, introducing an element of *intrapersonal distribution*.

To examine whether a poverty alleviation system results in greater lifetime *interpersonal redistribution* requires data for complete lifetimes, which are exceedingly rare. Given this lack of data, an alternative is to examine what Summers (1956) referred to as the 'latent lifetime income distribution' — that is, the lifetime distribution that would result if current conditions continued indefinitely. Economists and econometricians have used a number of techniques to simulate lifetime income profiles, but these have not allowed for the real life continual changes in the circumstances of individuals. The relatively recent technique of dynamic microsimulation, in contrast, allows the characteristics of individuals within the model to change constantly so that individuals may, for example, enter or leave the labour force, get married or divorced, and bear children (see Harding 1993a). One of the most striking findings from longitudinal data is how much diversity people experience over their lifetimes. Thus, dynamic microsimulation models are potentially a significant improvement on the static models used by econometricians in the past.

This paper investigates the hypothesis using data from two dynamic cohort microsimulation models developed in parallel for Australia (HARDING) and Great Britain (LIFEMOD). The examples of Australia and Britain are particularly germane to the question at hand. In the 1980s Australia undertook a radical reform of its social security system

that left it with perhaps the 'purest' social assistance system in the industrialised world. The British system, in turn, still has its foundations in the Beveridge report and remains the epitome of a social insurance-based system.

Chapter 2 discusses the construction of the two dynamic cohort models, focusing on their similarities and differences. Although developed in parallel and sharing a similar modular structure, the two models are not identical, perhaps more akin to 'kissing cousins' than sisters. Therefore, it is important to highlight where differences may be due to methodology rather than the operation of the respective social security systems. Chapter 3 summarises the social security systems in Australia and Britain, as modelled in HARDING and LIFEMOD. Chapters 4 and 5 contrast how these examples of social insurance and poverty alleviation systems perform in the lifetime income redistribution stakes. The chapters seek to provide answers to such questions as: how redistributional overall are the systems; what balance between intrapersonal and interpersonal redistribution do they produce; how far do the two systems converge in outcomes when compared over the lifetime; and, finally, is a poverty alleviation system really just that or does it, over the lifetime, imitate a social insurance system? Finally, chapter 6 summarises the main findings.

2. The models

The construction of both of the dynamic cohort models employed in this paper has been usefully described elsewhere (for HARDING see Harding 1993a; for LIFEMOD see Falkingham and Lessof 1991, 1992). Nevertheless, it is instructive to briefly describe their development, pointing out their similarities and differences.

2.1 Similarities

Both models simulate complete life histories for a pseudocohort of 2000 males and 2000 females. These individuals are dynamically aged from birth to death and experience major life events such as schooling, marriage, childbirth, children leaving home, employment and

retirement. At this stage, the cohort experiences no immigration or emigration; the only way in which the cohort changes size is from attrition due to mortality.

It is important to point out that the microunit that both HARDING and LIFEMOD simulates is the individual rather than the family or the household. Therefore it is only the characteristics of the cohort individuals that are modelled. For example, there is no comprehensive information on the children of each cohort member, but simply their age, parity, and whether they are participating in full-time education (that is, whether they are classified as dependent children). HARDING and LIFEMOD do not contain detailed information about the household composition of cohort members, unlike other microsimulation models such as that developed at Tilburg University (Nelissen 1993). However, since cohort members are selected to marry each other, the characteristics of an individual's spouse are available at each stage during their union. This is of particular importance in the labour market, income tax and social security modules, where these characteristics interact and the characteristics of both partners in the preceding period determine the characteristics of the present period. Specification of an individual's income also depends on the spouse's income.

The simulation process requires transition probabilities or behavioural equations as input for every variable generated. The various probabilities of demographic and other events occurring to people are estimated in the two models from a variety of sources (most notably published official statistics and secondary analysis of large sample social surveys such as the Australian income distribution survey and the UK general household and family expenditure surveys).

Given the uncertainty surrounding future changes in marriage and birth rates, labour force participation rates and so on, both models assume a steady state world and, as far as possible, all input data are calculated for a specific year. Therefore, the HARDING cohort is 'born' into and lives in a world that looks like Australia in 1986. Unfortunately, because of data availability, the two models were not constructed on the same base year. The LIFEMOD cohort lives in a world that looks like Britain in 1985. Although the steady state assumption results in a highly stylised 'population', it has been found to provide a useful benchmark against which current government policies and changes to those policies can be evaluated. Both the Canadian DEMOGEN and German SFB3 dynamic

cohort models also assume a steady state world when evaluating the impact of existing and potential government policies (Wolfson 1988, p. 233; Hain and Helberger 1986, p. 63).

2.2 Differences

Apart from the transition probabilities to which each cohort member is exposed, and the institutional structure of taxes and benefits of the Australian and British social security systems, there are several key programming differences that should be highlighted. The two models use common core code for the initial modules, particularly those concerned with family formation and dissolution. However, the models diverge in the approach taken to simulate labour force participation and earnings. HARDING models the number of hours spent in paid employment, self-employment or unemployment at a given age, whereas LIFEMOD models the number of weeks spent in any given state during the year. HARDING also uses techniques to generate the inequality apparent within the labour market, such as the existence of concentrated long term unemployment. LIFEMOD, like the DEMOGEN and SFB3 models, uses econometric techniques to simulate the decision to enter or leave the workforce, while the HARDING model follows the DYNASIM approach of using simple matrices of probabilities of participation (Orcutt, Caldwell and Wertheimer 1976). However, the HARDING matrices include most of the dependent variables in the LIFEMOD equations and both studies found educational attainment and workforce participation in the previous year to be among the main explanatory variables.

Because of data limitations, female labour force participation was modelled independently of spouse's employment patterns in HARDING. In LIFEMOD, however, the employment and earnings of married women are dependent on their husband's employment status and income. This might create more 'double-unemployed' couples in Britain than in Australia, given the well known disincentive effect of a husband's unemployment on a wife's labour supply. However, there is little evidence of such an effect when the lifetime distribution of earnings is examined.

Another difference is in the treatment of maintenance income. Both HARDING and LIFEMOD model the receipt of maintenance income by

sole mothers following divorce. However, in LIFEMOD payment of maintenance income by ex-husbands was also modelled. This is taken to be 'negative' income and thus depresses men's original income. This may account for the somewhat flatter distribution of original income in Britain than in Australia. However, this paper compares the change in the distribution between original and gross income (that is, the role of cash benefits) and between gross income and net income (that is, the role of taxes) rather than examining the shape of the original income distribution. Consequently, differences in modelling methodology are not expected to greatly influence the overall results.

2.3 Caveats and qualifications

The use of HARDING and LIFEMOD in distributional analysis of the kind presented in this paper involves a number of difficulties whose significance should be fully appreciated when interpreting the subsequent results. The problems apply equally to HARDING and LIFEMOD and a common approach has been taken to their resolution. Thus, if biases exist, they should apply equally to the two models.

Indirect and local government taxes

Both models currently ignore indirect taxes and are limited to the major cash transfers and income taxes administered by the central governments. Neither HARDING or LIFEMOD include taxes levied by other levels of government[1], the inclusion of which could (along with expenditure taxes) make a substantial difference to the findings. In the United Kingdom in 1985, income taxes and national insurance contributions amounted to 52 per cent of total central government revenue. In Australia in 1986, income taxes amounted to 51 per cent of all federal government revenue. During the 1980s the British government pursued a policy of shifting the tax burden from one of 'tax as you earn' to 'tax as you spend', and this has obvious implications for redistribution now.

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[1] In Britain in 1985 this was local authority rates, which were replaced by the infamous 'poll tax' in 1989-90 and succeeded by the council tax in 1993-94. In Australia, all three levels of government levy taxes or rates that are not included in this analysis.

Benefits in kind from other government funded services also affect lifetime income redistribution. Le Grand (1982) identified the education system as being particularly regressive over the course of life, with the middle classes benefiting disproportionately from expenditure on education (particularly higher education), although this conclusion is disputed by Harding using Australian data (1993a, p. 72). Both models do allow for the allocation of expenditure on education and, in the case of LIFEMOD, on the national health service; however, these expenditures are not included in this particular analysis (for a discussion of education transfers, see Harding 1995 and Barr and Falkingham 1993).

The counterfactual

In assessing the impact of the social security system on the distribution of income, the distribution after intervention necessarily has to be compared with the distribution before intervention. This immediately raises the question of what is the most appropriate 'before' benchmark or counterfactual. This study follows convention and measures the redistributional effect of the taxation and transfer systems against the original distribution of pre-tax and pre-transfer income. While it is clearly invalid to assume that the pattern of factor incomes would remain the same if there were no government, such an assumption is implicit in this study, as there are no data available indicating how the lifetime distribution of factor incomes in Australia or Britain would change if their governments were to disappear.

Assumed incidence of cash transfers and income taxes

The benefit of cash transfers is assumed to be fully incident on those to whom the transfers are paid. This assumption is controversial. It can be argued that the benefit of family allowances is incident equally on a husband and wife, or indeed on the children, rather than solely on the mother who is the formal recipient. Yet alternative assumptions are also not straightforward. Both governments have explicitly made the mother the recipient of child benefits (family allowances) because of doubts as to who received the benefits when it was paid to the husband. Similarly it is not clear that the benefits are fully incident on children (Barro 1974).

Likewise, the burden of taxation is assumed to be fully incident on those legally liable to pay the taxes. Those with such liabilities are also

assumed to pay them in full and no account is taken of possible tax evasion or of the 'underground' economy. However, full compliance is not mirrored in the case of benefit receipt, and both models incorporate assumptions of take-up rates. In LIFEMOD take-up of means-tested benefits is related to the size of entitlement (the higher the entitlement the greater the likelihood of an individual claiming it). In HARDING, take-up of the family income supplement is affected by self-employment status, the number of children and the size of the entitlement.

Real economic growth

A fourth issue is whether and how to allow for real economic growth. The 'unit of account' in both models is based on current earnings levels. Allowance could be made for real earnings growth as well as career progression in earnings as people become older, but then there would need to be a discount for the lower value of later receipts. Implicitly the approach adopted assumes that the effects of overall real economic growth and a real discount rate cancel each other out. In LIFEMOD, this means that, once in payment, benefits that are indexed to prices rather than earnings (such as public sector pensions or State Earnings Related Pension Scheme rights in retirement) are assumed to slip back each year at the rate of real earnings growth.

3. The systems

3.1 The British social insurance system

In LIFEMOD the individuals in the model live their entire lives in the demographic and economic environment of Britain as it was in 1985. Therefore, the social security benefits they receive and their direct tax liabilities are calculated under the rules of the taxation and benefit systems as they were in April 1985. The simulation of the systems is described in detail in Hills and Lessof (1993).

Entitlement to the majority of benefits within the British social security system depends on an individual's national insurance contribution record. The contribution in any year depends on earnings levels and the number of weeks of employment or self-employment. In 1985, employee

contributions had a ‘slab structure’, with reduced rates payable in certain earnings bands. Earnings above the upper earnings limit were exempt. The social security module of LIFEMOD follows this banded structure in modelling contribution liabilities.

In addition to the national insurance contribution, contributions to the State Earnings Related Pension Scheme (SERPS) and, where applicable, contributions to occupational pensions were also modelled. In 1985 it was possible for a (legally) married couple to choose between assessment of their joint income or assessment of individual incomes. In LIFEMOD the tax liabilities under both options are calculated. It is assumed that couples choose the option giving the lowest total liability: tax calculated jointly or tax on the part of a wife’s income that is deemed to be part of her husband’s income for tax purposes is then apportioned between the husband and wife.

Old age pensions constitute by far the largest cash transfer program on an annual basis and are the most significant cash benefit when viewed over a lifetime. Income support in old age in Britain takes the form of a two-tier pension. The first tier is provided by a universal flat rate basic state pension for which an individual must have sufficient qualifying years — that is, years in which a given amount of national insurance contribution is paid. People with home care responsibilities may be credited with contribution years toward the basic state pension even if in those years they paid insufficient national insurance contributions either because of low or no earnings. This is known as home responsibility protection. Receipt of this protection does not affect income in the year it is received but may affect future income streams.

The second tier is furnished by earnings-related pensions, which can be provided under SERPS or by an employer under an occupational pension scheme. In 1985 the number of private personal pensions were low, both in payment and in accumulation, and so these were not included in the modelling process. The majority of occupational pension schemes in Britain are defined benefit schemes with the pension linked to the level of final salary, whereas personal pensions pay a defined contribution. The latter are much more difficult to calculate in a steady state world. In LIFEMOD, pension rights are simulated along with SERPS and other pension entitlements as the cohort individuals age. The pension rights accumulated may be transferred to an individual’s

spouse in the event of them dying before pensionable age. Widows can also inherit occupational pensions.

As well as old age support there is a range of contingent benefits in Britain that are not subject to a means test — child benefit (which depends simply on the number of children and which is assumed in LIFEMOD to be incident on the mother except in the case of widowers); one parent benefit paid to lone parents; unemployment benefit paid for a maximum of 52 weeks in any two years to those who are unemployed and who have a good enough recent employment history; and invalidity benefit, severe disablement allowance, mobility allowance, attendance allowance and invalid care allowance, all of which depend on the degree of disability and age of original receipt. Income from all of these benefits, and tax liabilities, are modelled prior to calculating any eligibility for means-tested support.

Means-tested benefits include the supplementary benefit (now income support) or family income supplement (now family credit). The latter applies only to those who have children and have worked full-time for a period in the year. The amount received depends on the number and the ages of the children and on weekly income in relation to particular thresholds. Income support is available for individuals or couples with periods without full-time work during a year. The entitlement depends on family circumstances, age, previous receipt of income support, income and capital. Family credit is assumed to be received by women except in the case of widowed fathers. Where a couple is entitled to family credit, the amount received is taken to be part of the man's income. Additions to family credit for housing costs, along with other housing-related cash transfers such as housing benefit and rent and rate rebates, were not modelled in this version of LIFEMOD. Similarly subsidies available to owner occupiers through mortgage interest tax relief were also not included.

Means-tested benefits are assessed on a weekly rather than an annual basis. Where income varies over the year (for instance, because of a period of unemployment) benefit entitlement would generally be underestimated if receipt were calculated on the basis of average income over the whole year. Thus, annual income in LIFEMOD is divided between two periods — the period in which someone is employed full-time and the rest. Assessment for means-tested benefits is on a joint basis for couples (including those cohabiting but not married).

Student grants were simulated, but were treated as part of original income rather than as a social security type of cash benefit. This is different from the approach adopted in the Australian model.

3.2 The Australian social assistance model

The Australian social security system principally consists of a range of income-tested payments that are available to those with particular characteristics (the simulation of the system is described in detail in Harding 1993a). The social security cash transfers simulated in the model, with 1986 payment rates and income tests, are the age pension, invalid pension, wife's pension, carer's pension, widow's pension, supporting parent's benefit, unemployment benefit, sickness benefit and special benefit. All of these transfers were income tested on the income of the individual (or husband and wife for married or de facto couples), and bore no relation to previous periods in the labour force or previous earnings. In addition to the basic rates, all of those receiving the above payments could receive a number of additional allowances, of which additional pension and benefit (paid for dependent children) and the mother's or guardian's allowance (paid to those receiving the widow's pension or the supporting parent's benefit) were included in the model. Rent assistance, which was paid to pensioners and beneficiaries who were private renters, was not included in the model because of the lack of housing data from the 1986 income distribution survey.

Family income supplement was payable to low income families with dependent children who were not receiving any other form of income support from the federal government — that is, effectively those who were in the labour force. Only two payments in 1986 were not income tested and included in the model. One was the family allowance, which was payable monthly to people with dependent children aged less than 16 years, full-time dependent students aged 16 and 17 years not receiving education transfers, or similar students aged 18–24 years in very low income families. The multiple birth payment to the parents of triplets or quads aged under 6 years was also modelled.

All benefits and supplements for couples were paid by the Department of Social Security to the husband, while pensions were split equally between partners but any additional payments for the children of pensioners were paid to the wife. The family allowance, multiple birth

payment and family income supplement were all expressly paid to the mother in married couples. All of these provisions were fully incorporated within the simulation.

The simulation of social security transfers was very comprehensive. A small number of payments were not modelled but, overall, 97 per cent of the outlays on pensions, 99 per cent of the outlays on benefits and 98 per cent of the outlays on child transfers were captured in the simulation. Apart from waiting periods and a few special provisions, eligibility for social security cash transfers was essentially based on weekly income. Consequently, eligibility for most payments was based on the income and circumstances of each family during each week of each year in the model.

In 1986 all pensions and the supporting parent's benefit were both income and asset tested. It was not possible to model the assets test adequately because of the lack of data about assets in Australia. A number of techniques were therefore used to produce an appropriate degree of take-up for the age pension, sickness and special benefit and the family income supplement. (The age pension was the principal source of income for most retirees in Australia, with 79 per cent of the population of age pension age receiving the age pension in 1986. Others received occupational pensions from their employers, which were generally linked to final average salary and length of service.)

The Department of Education also provided two major transfers in 1986, income tested on the income of both parents and students — the Secondary Allowances Scheme (SAS) and the Tertiary Education Assistance Scheme (TEAS). Both of these were simulated in the model, as was the Postgraduate Awards Scheme. These payments were counted as part of the cash transfer system when assessing the redistributional impact of government (in contrast to the British methodology, which counted them as original income).

Moving to the income tax system, the tax unit in Australia is the individual, although those with particular family circumstances can claim a number of special deductions or rebates. The 1985-86 Australian income tax scales were modelled, as were the dependent spouse rebate, the sole parent rebate, and the pensioner and beneficiary rebates for social security recipients. The Medicare levy, which was a special tax supplement set at 1 per cent of taxable income, was also modelled. The

Australian and British income tax scales are compared in table 1, along with some cash transfer payment rates.

Table 1: **Australian and British direct tax scales and selected cash transfers** A$1 = £0.485

Taxable income	**Marginal tax rate (for single taxpayer)**
Britain 1984-85	
$0–$3645	9% [a]
$3645–$4546	9% (above lower earnings limit for national insurance contribution)
$4546–$26 804	39% (above single person allowance, until upper earnings limit)
$26 804–$39 587	40%
$39 587–$50 309	45%
$50 309–$66 598	50%
$66 598–$82 887	55%
$82 887 +	60%
Australia 1985-86	
$0–$4595	0%
$4595–$12 500	25%
$12 500–$19 500	30%
$19 500–$28 000	46%
$28 000–$35 000	48%
$35 000 +	60%
Base pension in Australia at June 1986	
Single person	$102.10 per week
Married couple	$170.30 per week
Supplementary benefit in Britain at June 1985	
Single person	$57.84 per week
Married couple	$93.90 per week

[a] If earnings are less than A$3645 in a year, no national insurance is paid. Once earnings exceed A$3645, 9 per cent national insurance contribution is levied on the entire amount.

4. Lifetime redistribution: social insurance versus poverty alleviation systems

This chapter compares the overall lifetime redistributional impact of the British social security system as it was in 1985 with the impact of the Australian system in 1986. Individuals are ranked in decile groups (ten equal sized groups) by a measure of lifetime living standards. Rather than using total lifetime income, the ranking uses each individual's *annualised lifetime equivalent net family income.* Four distinct decisions are being made here about the ranking measure.

First, lifetime income is *annualised* by averaging total lifetime net income over each year of life from the age of 16 years. This has the advantage of avoiding locating people in the upper part of the income distribution just because they have a long life and have the longest time to accumulate total income. Conversely, if annualised income were not used, those who died in their 20s and 30s would appear to have a low lifetime income and thus a low standard of living, whereas their incomes while they were alive might have been very high. Cohort individuals who die before the age of 17 years are excluded from the analysis, as the majority of this group would not have entered the labour force and thus would have zero annualised income. Annualised income measures can be viewed as the average amount of income received during each year of adult life.

Second, *net* or disposable 'after-tax' income is used in preference to gross income as it provides a more accurate measure of the living standards attained by individuals and families.

Third, income is *equivalised* to allow for different family circumstances of cohort individuals. If equivalent income were not used, a person with an annualised income of half a million dollars and no dependants, for example, would be regarded as having experienced the same lifetime standard of living as another person with the same annualised income who supported a spouse and three children.

Fourth, although it is the individual who is the unit of analysis, when a cohort member is living with other adults the equivalent income of the family is attributed to them. This assumes that each person in a family experiences the same standard of living — that is, the income is shared equally within the family. Research by Edwards (1981) and Pahl (1990) suggests that this is not always the case. In other work the sensitivity of varying this assumption of equal sharing has been explored (Falkingham and Hills 1995; Harding 1993a), but here analysis is limited to this central case.

There are numerous difficulties with equivalence scales and it is not clear which scale is the most appropriate — especially for international comparative analysis (see Coulter, Cowell and Jenkins 1992 for a full discussion of the problems). The equivalence scale used in both the Australian and British results is that implicit in the British social security system in 1985 — the so-called 'McClements scale' — but it has been

rescaled so that a single adult is given the value of 1.00 (that is, to give family income per equivalent adult). (Additional adults are given the value of 0.64, children aged under 2 years 0.15, aged 5–7 years 0.34, aged 8–10 years 0.38, aged 11–12 years 0.41, aged 13–15 years 0.44 and aged 16–17 years 0.59.)

Table 2 presents the composition of lifetime income for the two model cohorts in decile groups ranked by the measure of lifetime living standards (that is, equivalent net family income averaged over each year of life from the age of 16 years). One thing that is immediately clear from the table is that lifetime incomes, however measured, appear to have been higher in Australia than in Britain. This may be due to different lengths of life or other demographic or social factors, or it may be due to differences in the modelling. For example, the British world of 1985 has been modelled while Australian incomes a year later in 1986 should be expected to have been somewhat higher as the Australian consumer

Table 2: **Composition of lifetime income by deciles ranked by annualised lifetime equivalent net family income** A$1 = £0.485

	Decile by annualised lifetime equivalent net family income										
	1	2	3	4	5	6	7	8	9	10	All
	A$'000	A$'000	A$'000	A$'000	A$'000	A$'000	A$'000	A$'000	A$'000	A$'000	A$'000
Australia											
Earnings	279	400	461	533	609	696	784	852	1 007	1 478	710
Original income	297	430	498	591	672	785	903	1 028	1 257	1 946	841
Cash transfers	89	107	94	87	75	64	55	40	29	13	65
Gross income	386	537	592	678	747	849	957	1 068	1 286	1 959	906
Income tax	45	77	97	128	154	193	240	290	395	745	237
Net income	341	460	495	551	593	656	717	778	891	1 214	670
Equiv. net income	359	477	518	577	619	676	724	800	887	1 166	680
Annualised equiv. net income	5 864	7 540	8 468	9 395	10 265	11 184	12 220	13 530	15 450	20 157	11
Britain											
Earnings	222	330	402	437	530	614	680	682	792	1 070	558
Original income	241	357	431	474	538	579	674	752	876	1 221	612
Cash transfers	134	132	134	140	136	146	136	146	123	120	136
Gross income	375	487	563	614	674	726	810	899	1 000	1 342	745
(National insurance contribution)	38	57	74	87	103	115	140	167	200	315	39
(Income tax)	16	25	29	31	37	39	43	47	54	62	130
Total direct taxes	52	82	105	118	140	154	183	214	254	377	169
Net income	323	404	458	497	534	571	627	682	746	965	581
Equiv. net income	328	421	476	525	555	604	643	715	769	964	599
Annualised equiv. net income	5 670	7 320	8 124	8 783	9 402	10 041	10 845	11 856	13 260	16 620	10

price index, for example, increased by 8.4 per cent between June 1985 and June 1986. The difference may also be due to the exchange rate used to convert the pound sterling to dollars (the average rate during the Australian financial year 1985-86 — the best that could be achieved in a comparison of Australia in 1986 with Britain in 1985). The absolute amounts are very sensitive to the exact rate and so direct comparisons of absolute amounts between the two countries should be treated with some caution. Of more interest is the *pattern of income composition within deciles and the distribution of income.*

In contrast to traditional cross-sectional or annual distributional studies, the distribution of lifetime income appears to be more equitable. Most notably, even the lowest income deciles have significant amounts of income from earnings, constituting over half of total lifetime gross income. Higher lifetime *original incomes* are the product of higher earnings and greater investment income and increased access to occupational superannuation (pensions). Although not shown in the table, the distribution of private pension income is highly skewed towards those in the top three deciles of lifetime income.

Table 3 shows the share of various income and tax measures received by each decile. It simply re-expresses the dollar values shown in table 2 as decile shares, to aid interpretation. Table 3 suggests that, despite the higher dollar values of earnings and original factor income in Australia, the share of earnings received by each decile was very similar in the two countries. Nonetheless, at the top end of the earnings distribution there was some divergence, with the top 10 per cent of the population in Australia receiving 20.8 per cent of total gross lifetime earnings but the top decile in Britain receiving only 19.1 per cent.

Other components of original income (that is, private occupational pensions and investment income) appear to have been more unequally distributed in Australia than in Britain. The top 10 per cent of Australians received 23.2 per cent of total gross original income according to the HARDING model, while the top 10 per cent of the British population received 19.9 per cent of British gross original income according to LIFEMOD (table 3). Some of these discrepancies may be due to different methods of modelling earnings, investment income and superannuation in the two models. However, it should be noted that this finding is not out of step with comparisons of the inequality of the *annual* (rather than lifetime) distribution of income in the two countries.

For example, Mitchell (1991, p. 123) found that the distribution of original income in Australia was more unequal than the distribution of original income in the United Kingdom.

Cash transfers were much more important in Britain than in Australia for every decile. As table 2 shows, the 10 per cent of the Australian population with the lowest lifetime incomes received on average A$89 000 in cash transfers during their lives. This compares with the A$134 000 received by the poorest 10 per cent of the British population. In Australia, cash transfers generally declined in absolute value as income increased. In contrast, in Britain the absolute value of lifetime total cash benefits was relatively flat across the whole income distribution (with a slight rise in the middle, followed by a slight dip). Thus, while the top decile of Australians received on average only A$13 000 of cash transfers during their lifetimes, the top decile of the British population averaged A$120 000 of benefits. And the bottom

Table 3: **Shares of lifetime income by deciles ranked by annualised lifetime equivalent net family income**

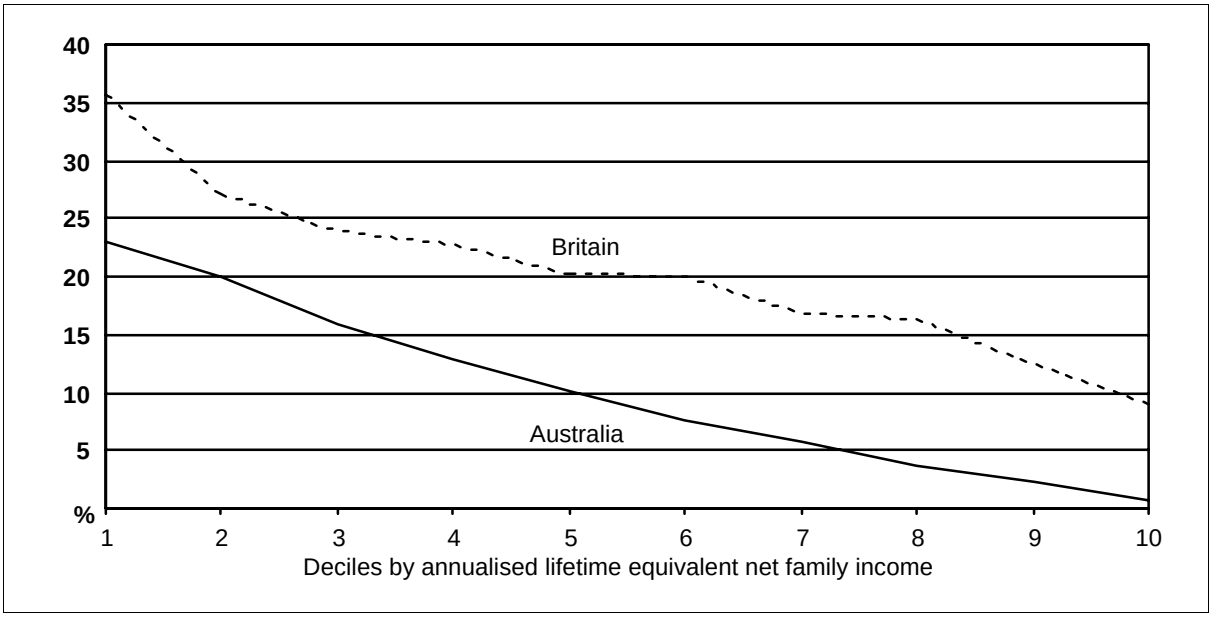
	Decile by annualised lifetime equivalent net family income										
	1	2	3	4	5	6	7	8	9	10	All
	%	%	%	%	%	%	%	%	%	%	%
Australia											
Earnings	3.9	5.6	6.5	7.5	8.6	9.8	11.1	12.0	14.2	20.8	100
Original income	3.5	5.1	5.9	7.0	8.0	9.3	10.7	12.2	14.9	23.2	100
Cash transfers	13.6	16.4	14.4	13.4	11.4	9.8	8.4	6.1	4.4	2.0	100
Gross income	4.3	5.9	6.5	7.5	8.2	9.4	10.6	11.8	14.2	21.7	100
Income tax	1.9	3.2	4.1	5.4	6.5	8.2	10.2	12.2	16.7	31.5	100
Net income	5.0	6.8	7.4	8.2	8.8	9.7	10.7	11.6	13.2	18.2	100
Equiv. net income	5.2	7.0	7.6	8.5	9.1	9.9	10.7	11.8	13.0	17.1	100
Annualised equiv. net income	5.1	6.6	7.4	8.2	9.0	9.8	10.7	11.8	13.5	17.7	100
Britain											
Earnings	4.0	5.9	7.2	7.8	8.9	9.5	11.0	12.2	14.2	19.1	100
Original income	3.9	5.7	7.0	7.7	8.8	9.4	10.9	12.2	14.2	19.9	100
Cash transfers	10.0	9.7	9.9	10.4	10.0	10.8	10.1	10.8	9.2	8.9	100
Gross income	5.0	6.5	7.5	8.2	9.0	9.7	10.8	12.0	13.3	17.9	100
National insurance contribution	4.1	6.2	7.8	8.3	9.4	10.0	11.3	12.6	14.0	16.1	100
Income tax	2.3	4.5	5.8	6.7	8.0	8.9	10.8	12.9	15.4	24.2	100
Total direct taxes	3.0	4.9	6.2	7.0	8.3	9.2	10.9	12.9	15.1	22.4	100
Net income	5.6	7.0	7.9	8.5	9.2	9.8	10.8	11.8	12.8	16.6	100
Equiv. net income	5.5	7.0	8.0	8.7	9.2	10.1	10.7	11.9	12.8	16.1	100
Annualised equiv. net income	5.7	7.1	7.9	8.4	9.2	9.7	10.7	11.5	13.0	16.8	100

decile in Australia received almost 600 per cent more in cash transfers than the top decile — in sharp contrast to the bottom decile in Britain, which received only 12 per cent more than the top decile.

Nonetheless, cash transfers in Britain were still progressive, amounting to a higher proportion of the income of the lifetime poor than of the lifetime rich. Figure 1 shows the average amounts of cash transfers received by deciles, ranked by annualised lifetime equivalent net family income, expressed as a percentage of their lifetime average gross income. In Britain the lifetime cash transfers received by the bottom decile amounted to just over 35 per cent of the group's lifetime gross income, while the comparable figure in Australia was about 23 per cent. For the top income decile, cash transfers in Britain amounted to 9 per cent of lifetime gross income while, in Australia, the comparable figure was less than 1 per cent.

What about direct taxes? For Australia, federal income tax was included in the simulation and for Britain the comparable taxes were income taxes plus national insurance contributions. Direct taxes amounted to a higher proportion of lifetime gross income in Australia than in Britain — 26 per cent on average in Australia compared with 23 per cent in Britain (table 2). For the poorest 10 per cent of the Australian cohort, total lifetime direct taxes amounted to A$45 000 on average, compared with A$52 000

Figure 1: **Total lifetime cash transfers received as percentage of total lifetime gross income by deciles ranked by annualised lifetime equivalent net family income**

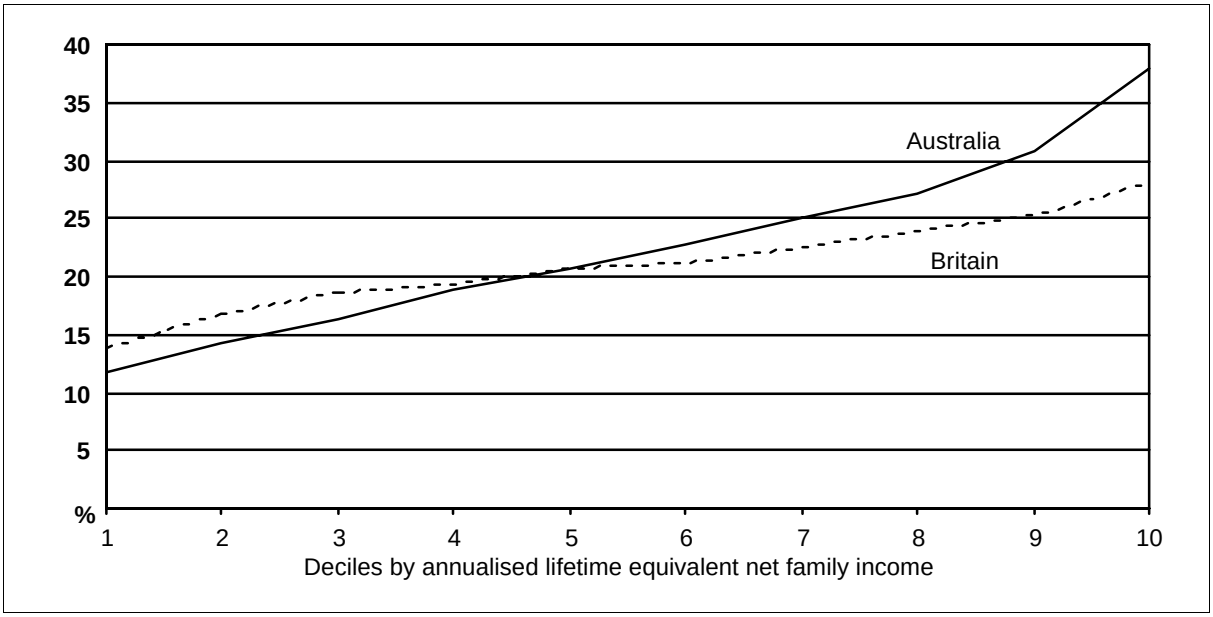


for the British cohort. For the top decile in Australia, direct taxes averaged just under A$750 000 while for the top decile in Britain total lifetime direct taxes totalled only A$377 000.

The poorest 10 per cent of the Australian cohort contributed 1.9 per cent of total lifetime direct taxes, compared with 3 per cent for the bottom British decile (table 3). The top decile shouldered a larger proportion of the lifetime direct tax burden in Australia than in Britain — 31.5 per cent compared with 22.4 per cent. (This is in part a product of the interaction of higher incomes of the top decile in Australia, but is also due to a much more progressive income tax scale.)

Figure 2 shows direct tax burdens as a percentage of gross lifetime income for deciles ranked by annualised lifetime equivalent net family income. For the bottom decile, lifetime direct taxes amounted to 12 per cent of gross lifetime income in Australia and 14 per cent in Britain. The two tax incidence lines crossed at the fifth decile, with direct taxes amounting to 38 per cent of the gross income of the top decile in Australia and only 28 per cent for that decile in Britain. On the face of it, figures 1 and 2 suggest that both the cash transfer and direct tax systems were more progressive over the lifetime in Australia than in Britain. Does this necessarily mean that the net effect of the tax and transfer systems was more progressive in Australia?

Figure 2: **Total lifetime direct taxes paid as percentage of total lifetime gross income by deciles ranked by annualised lifetime equivalent net family income**

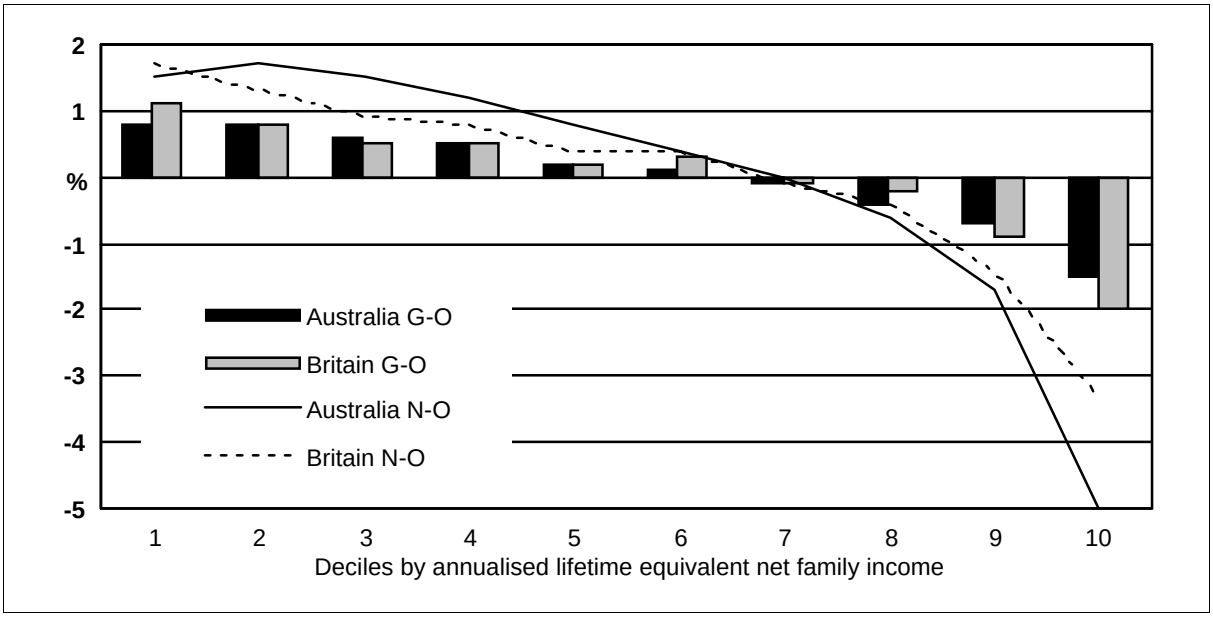


The direct comparison of the redistributional impact of the taxation and benefit systems is clouded by the fact that the two countries start from different underlying distributions. What is of central concern to the hypothesis, however, is not that lifetime incomes appear to be more unequally distributed in Australia than in Britain; rather it is the impact that the taxation and benefit systems have on that distribution. The effect of the social security system is shown by the difference between the distribution of original income and the distribution of gross income, while the impact of the direct taxation system is reflected in the difference between the distribution of gross income and the distribution of net income (disposable income). The redistributional effect of the other main instrument of redistribution, the family, can be illustrated by comparing net income with equivalent net income.

Figure 3 shows the difference made by the taxation and transfer systems to the shares of lifetime income accruing to each decile within the two countries. The figure shows that the cash transfer system increased the bottom decile's share of lifetime income more in Britain than in Australia. That is, while the bottom British income decile received 3.9 per cent of lifetime original income, this share was increased by cash transfers to 5.0 per cent of gross income — the 1.1 per cent increase illustrated in figure 3. In contrast, the share of income accruing to the bottom income decile in Australia was increased by only 0.6 per cent as a result of the cash transfer system. This suggests that, although the cash transfer system appeared less progressive in Britain, it nonetheless had a larger redistributional impact over the lifetimes of those with the lowest lifetime incomes than the Australian system did — no doubt due to the higher absolute level of transfers. However, as figure 3 shows, this effect was apparent for only the bottom decile; for deciles two to five, the impact of the cash transfer system on income shares was very similar in both countries.

Interestingly, despite the far larger cash transfers paid to upper income families in Britain than in Australia, for the top 20 per cent of the cohort the British cash transfer system nonetheless produced a larger decline in income share than the Australian transfer system did. The top decile's share of income in Britain, for example, declined by 2 per cent (from 19.9 per cent to 17.9 per cent) as the income measure was shifted from original to gross income. In contrast, the top decile's share of income in Australia was reduced by only 1.5 per cent by cash transfers.

Figure 3: **Changes in lifetime income shares accruing to each decile, ranked by annualised lifetime equivalent net family income, as a result of the transfer and direct taxation systems**



Note: Australia G-O measures the impact of the cash transfer system, and is the percentage share of gross income accruing to a particular decile minus the percentage share of original income accruing to the same decile. A positive result thus means that the cash transfer system increases the income share accruing to a decile. Australia N-O measures the combined impact of the taxation and transfer systems, and shows the percentage share of net income accruing to a particular decile minus the percentage share of original income accruing to that decile.

Moving to the taxation system, the Australian taxation system appears to have changed net income shares to a greater extent than the British system does, except for the lowest income decile. Consequently, the net effect of the Australian taxation and transfer systems was to increase the income share accruing to deciles two to five by more than the taxation and transfer systems in Britain did. Similarly, the more progressive Australian direct tax structure resulted in the income share of the top 30 per cent of the cohort being reduced by more as a result of the taxation and transfer systems than was the case with the British systems. It is notable that in both countries the crossover point between net gain and net loss occurs at the seventh decile.

A useful summary measure of inequality is provided by Gini coefficients. Table 4 shows these for various lifetime income measures for the HARDING and LIFEMOD cohorts. The Gini coefficient has a value of one when one person receives all of the income in a society and

a value of zero if income is equally distributed among all persons. The higher the Gini coefficient, the more unequal the distribution of income being measured.

The cash transfer system in Australia reduced the Gini coefficient (from original income to gross income) by 0.038. In Britain, although the absolute amounts of cash benefits in table 2 were much more evenly spread across the deciles, the Gini coefficient was reduced by 0.055. Thus, the cash transfer system had a greater equalising effect in Britain than in Australia.

The direct taxation system further reduced the Gini coefficients. The additional reduction in Britain was relatively small — only 0.027, even though the absolute amounts of direct taxes paid exceeded cash transfers received. In Australia, however, the reduction was larger — 0.059. Overall, the net effect of the tax and transfer systems in Britain, reflected in the difference between the disposable and original income distributions, was a reduction in the Gini coefficient of 0.082. In Australia the net effect was greater — 0.097. Nonetheless, the lifetime distribution of disposable income — as measured by the Gini coefficient — remained more equal in Britain than in Australia.

All of the preceding analysis simply shows the income personally received by cohort individuals within the two models. In many cases this would not provide an accurate indicator of the standard of living achieved by individuals. This is because those with a low original income of their own might have lived in a family where they shared, for example, the earnings of their spouse. To examine the redistributional impact of the family, the difference between the distribution of the disposable incomes of individuals is compared with the distribution of

Table 4: **Gini coefficients for lifetime income measures**

Income measure	Australia	Britain
Original income	0.370	0.327
Gross income	0.332	0.272
Net (disposable) income	0.273	0.245
Equivalent net family income	0.220	0.204
Differences		
Gross income minus original income	-0.038	-0.055
Net income minus gross income	-0.059	-0.027
Net income minus original income	-0.097	-0.082
Equivalent net income minus net income	-0.053	-0.041

the disposable incomes of the families in which those individuals lived. Table 4 suggests that the role played by families in redistributing lifetime income was as great as that of the taxation system in Australia. Thus, while the Australian taxation system reduced the Gini coefficient by 0.059 the impact of the family on disposable income reduced the Gini coefficient by 0.053. In Britain the family played less of a role but was still very influential, reducing the Gini coefficient by 0.041. One reason for this is that the LIFEMOD cohort experienced a higher incidence of marital dissolution than did the HARDING cohort and thus spent a greater proportion of their lifetimes in single adult households where there was no opportunity to benefit from income sharing.

5. Intrapersonal versus interpersonal redistribution

From the models it is possible to identify receipts of cash benefits that were 'paid for' at another stage in an individual's life (intrapersonal redistribution) and those that represent net transfers from others (interpersonal redistribution). To separate the net transfers within the model populations, it was necessary to make an assumption about the taxes allocated to pay for them. This can be done in two ways:

- assuming only *direct taxes were used to finance benefits* — thus, it is assumed that in Britain cash benefits were financed by all of the national insurance contributions and 58 per cent of the income tax paid by each group and that in Australia 27.6 per cent of all income taxes paid by the cohort financed all cash transfers received by the cohort; and
- assuming that a proportion of *both direct and indirect taxes was used.* Indirect taxes are not modelled in the original versions of HARDING and LIFEMOD (although see Harding 1993b) but in recent years the combined effect of direct and indirect taxes in Britain has come close to being proportional to gross income[2]. The combination of direct and indirect taxes is therefore proxied by assuming financing from

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[2] For instance, for the United Kingdom the Central Statistical Office (1992, appendix 4, table 2) shows the Gini coefficients of equivalised gross income and equivalised post-tax income (that is, after both direct and indirect taxes) as equal — 0.32 in 1985.

the percentage of each individual's gross income required to pay for benefits in aggregate. In HARDING 7.2 per cent of the lifetime gross income received by all cohort members would finance all cash transfers received by the cohort. In Britain the corresponding figure was 16.3 per cent.

Two possible financing scenarios are thus tested. By adopting such an approach, the counterfactual assumptions used are that, in the absence of cash transfers from the welfare state, individuals would have to pay correspondingly less tax :

- in proportion to their direct tax liabilities; or
- in proportion to their gross income.

Thus it is hoped that systemic differences in taxation structures between the two countries are controlled for.

5.1 Financing from direct taxes

The first line of data in table 5 shows for deciles ranked by the measure of living standards — annualised lifetime net family income — total

Table 5: **Lifetime net taxes and benefits funded by 'allocated' direct taxes by deciles ranked by annualised lifetime equivalent net family income** A$1 = £0.485

	Decile by annualised lifetime equivalent net family income										
	1	2	3	4	5	6	7	8	9	10	All
	A$'000	A$'000	A$'000	A$'000	A$'000	A$'000	A$'000	A$'000	A$'000	A$'000	A$'000
Australia											
Cash benefits	89	107	94	87	75	64	55	40	29	13	65
Allocated direct tax	12	21	27	29	43	54	66	80	109	206	65
Lifetime net benefit	78	88	71	58	42	27	15	6	2	0	40
Lifetime net tax	1	2	4	6	10	17	26	46	82	193	40
Self-financed benefits	11	19	23	23	33	37	40	34	27	13	25
Average lifetime gain	+77	+86	+67	+52	+32	+10	-11	-40	-80	-193	
Britain											
Cash benefits	134	132	134	140	136	146	136	146	123	120	136
Allocated direct tax	41	68	84	97	113	126	148	173	204	297	136
Lifetime net benefit	97	74	64	64	52	54	39	35	21	12	52
Lifetime net tax	4	10	14	21	29	34	51	62	102	189	52
Self-financed benefits	37	58	70	76	84	92	97	111	102	108	84
Average lifetime gain	+93	+64	+50	+43	+23	+20	-12	-27	-81	-177	

lifetime cash benefit receipts. The following line shows what each group would contribute in direct taxes to finance the cash benefits of the entire cohort. The calculations in the remainder of the table show net receipts and payments using these 'allocated' tax payments.

During each year of life individuals might pay tax, receive cash benefits or (for perfectly good reasons) both. In the last case, some or all of the benefits they received in a year would be paid for by their own direct tax in the same year — that is, there would be intrapersonal redistribution *within the same year* (sometimes known as 'churning'). For example, some people would receive:

- taxable benefits (such as the state pension);
- non-taxable benefits but pay tax on other income (for instance, women with earnings receiving child benefit); or
- benefits because they are out of work for part of a year, but pay tax on earnings in the rest of it.

People might also pay for their own benefits in other years of their lives. Over their whole lives, individuals are either net lifetime taxpayers or net lifetime benefit recipients (or, conceivably, neither if they break even).[3]

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[3] Algebraically the various measures can be expressed as follows. Let *Bi* be the gross cash benefits received by individual *i* in year *t*, and *Ti* be the gross (allocated) tax paid by them in that year. Then the aggregate gross cash benefits, *G*, for the model population over its entire lifetime is given by:

$G = \sum_{i\,Bi} = \sum_{i\,Ti}$.

Self-financed benefits, *SFB*, are given by:

$SFB_i = Ti$ (if $Bi > Ti$)

$= Bi$ *(if* $Bi < Ti$*).*

An individual's net lifetime gain, *Ni*, is:

$Ni = Bi - Ti$.

Total *interpersonal* redistribution, *IR*, is the sum of positive net lifetime gains and is given by:

$IR = \sum_{i\,(Ni\,Ni > 0)}$.

Total *intrapersonal* redistribution, *IA*, is the sum of self-financed benefits:

$IA = \sum_{i\,SFBi}$ (and by construction, $G = IR + IA$).

Table 5 illustrates the scale of such 'self-financing' of benefits (intra-personal redistribution), together with the net lifetime taxes or benefits of individuals in excess of self-financed benefits (interpersonal redistribution). For example, the bottom income decile in Australia received a total of A$89 000 in cash transfers during their lifetimes. About 28 per cent of the total income tax that they paid during their lifetimes financed all cash transfers, so that their allocated direct tax burden was about 28 per cent of the A$45 000 of lifetime direct tax shown in table 2 (that is, about A$12 000). In other words, out of all the cash transfers paid to the entire cohort during their lifetimes, the bottom decile contributed on average A$12 000 of the direct taxes that financed those cash transfers.

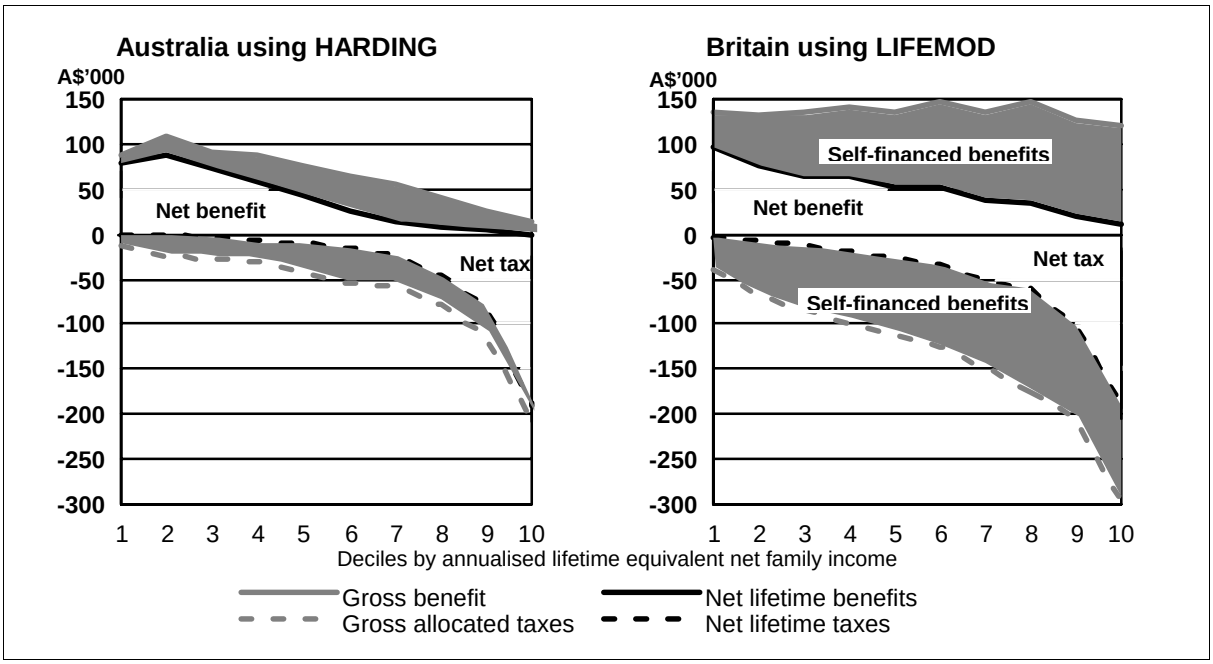
Of this A$12 000 allocated tax burden, A$11 000 was paid back in the form of cash transfers. The bottom Australian decile thus financed A$11 000 of the A$89 000 of cash transfers that were paid to them. Most individuals in the bottom Australian decile were net lifetime beneficiaries after taking account of cash transfers received and allocated taxes paid — the average lifetime net benefit for the entire decile being A$78 000. However, a few individuals within this decile were net lifetime taxpayers. In other words, a few individuals in the bottom decile paid out more in allocated taxes during their lifetimes than they received in cash transfers. For the decile as a whole, the lifetime allocated tax that they paid out and that financed the benefits of others averaged about A$1000. Consequently, the average lifetime gain for this group was A$77 000. Therefore, the 'self-financed benefits' rows in table 5 show the scale of intrapersonal redistribution and the 'average lifetime gain' rows show the scale of interpersonal redistribution.

The bottom decile in Britain received much more in cash transfers than the bottom Australian decile did, but they also paid much more allocated direct tax. The poorest decile in Britain paid for about 28 per cent of the cash transfers that they received (in contrast to only 12 per cent for the bottom Australian decile). However, the bottom decile in Britain still received an average lifetime gain of A$93 000 — much higher than the average lifetime gain of A$77 000 received by the bottom Australian decile. For deciles two to five, however, the Australian tax and transfer systems delivered more interpersonal redistribution. The average lifetime gain for those in the bottom half of the lifetime income distribution averaged A$63 000 in Australia but A$55 000 in Britain.

The proportion of gross benefits received by each decile that represented intrapersonal rather than interpersonal redistribution grew rapidly as incomes increased. In Britain, by the third decile the majority of the group's gross receipts were self-financed; the same was true by the sixth decile in Australia. For the top group, A$108 000 out of the A$120 000 received on average in Britain was self-financed and the net taxpayers within the group paid out A$189 000 (averaged over the whole group). The pattern for the entire cohort is shown in the final column of table 5. On average, HARDING model individuals received A$65 000 in cash transfers over their lifetimes — A$25 000 or 38 per cent representing benefits that individuals effectively paid for themselves. In Britain, individuals averaged A$136 000 in lifetime cash transfers — A$84 000 or 62 per cent financed from their own taxes.

This pattern is summarised in figure 4. The top line for each country shows average gross benefits of each decile group, and the bottom line the average gross (allocated) taxes paid. Deducting the totals of annual and lifetime clawback leaves the two unshaded areas in the top and bottom of the diagram — the net lifetime benefits of lifetime gainers and the net lifetime taxes of lifetime losers. It is these unshaded areas that represent the interpersonal redistribution. Judged by Robin Hood criteria, this redistribution is progressive (although somewhat

Figure 4: **Lifetime taxes and benefits by deciles ranked by annualised lifetime equivalent net family income** A$1 = £0.485



approximate, with some net lifetime taxpayers at the bottom and a rather larger number of net lifetime gainers at the top), and is much more so in Australia than in Britain.

The shaded areas (of equal size for each group at the top and the bottom of the diagram) show the intrapersonal redistribution. In the Australian system, on average 38 per cent (A$25 000) of lifetime benefits were paid for by the same individual at another stage in their life while 62 per cent were paid for by others. By coincidence, the proportions are reversed in Britain, with 62 per cent of benefits constituting intrapersonal redistribution and 38 per cent interpersonal redistribution. So far, the null hypothesis seems unequivocally unrejected.

5.2 Financing from all taxes

The above results are based on the assumption that cash benefits are financed by progressive direct taxes. Table 6 shows the results of making the alternative assumption that financing comes from a share of all tax revenues. The assumption is that tax is proportional rather than progressive, with allocated tax amounting to a constant proportion of gross income in both countries.

Table 6: **Lifetime net taxes and benefits funded by 'allocated' direct tax by deciles ranked by annualised lifetime equivalent net family income** A$1 = £0.485

	Decile by annualised lifetime equivalent net family income										
	1	2	3	4	5	6	7	8	9	10	All
	A$'000	A$'000	A$'000	A$'000	A$'000	A$'000	A$'000	A$'000	A$'000	A$'000	A$'000
Australia											
Cash benefits	89	107	94	87	75	64	55	40	29	13	65
Allocated direct tax	28	38	42	49	54	61	70	77	93	141	65
Lifetime net benefit	64	73	58	46	33	21	11	5	2	0	31
Lifetime net tax	3	4	6	8	12	18	26	42	66	128	31
Self-financed benefits	25	34	36	41	42	43	44	35	27	13	34
Average lifetime gain	+61	+69	+52	+38	+21	+3	-15	-37	-64	-141	
Britain											
Cash benefits	134	132	134	140	136	146	136	146	123	120	136
Allocated direct tax	77	88	103	110	122	130	145	162	178	242	136
Lifetime net benefit	72	55	47	49	41	44	32	33	19	10	40
Lifetime net tax	5	11	16	19	27	28	41	49	74	132	40

Self-financed benefits	72	77	87	91	95	102	104	113	104	110	96
Average lifetime gain	+67	+44	+31	+30	+14	+16	-9	-16	-55	-122	

Four differences from earlier results stand out.

- The proportion of intrapersonal redistribution rises from 38 per cent to 52 per cent in Australia and from 62 per cent to 71 per cent in Britain.
- The average net gains to the bottom deciles are reduced and, symmetrically, the net loss of the top groups are decreased. Thus, there is less interpersonal redistribution.
- The interpersonal redistribution involved, while of a smaller scale than when direct taxes are assumed to be the source of finance, is nonetheless progressive.
- Even controlling for the finance mechanism, the British social security system results in more intrapersonal redistribution than the Australian system does and less interpersonal redistribution.

6. Summary

All social security and income tax systems are intended to generate both interpersonal redistribution of income (from those with high to those with low incomes) and intrapersonal redistribution (from one period of an individual's life cycle to another). Until now, most analyses of the redistributional impact of the taxation and transfer systems have been limited to the interpersonal redistribution generated at a single point in time. The lack of lifetime data has limited the capacity to answer questions about the intrapersonal and interpersonal redistributional impact of the modern welfare state over a longer period. This paper represents a first attempt to undertake international comparative work about the lifetime redistributional effects of social systems that emphasise social insurance goals and those that emphasise poverty alleviation goals.

The work was based on two dynamic cohort microsimulation models that put 4000 simulated British individuals and 4000 simulated

Australian individuals through their life cycles — from birth to death. Although some aspects of life have been modelled differently, the models are in many respects unusually comparable, having being developed with a high degree of cooperation.

The Australian lifetime income distribution appeared more unequal than the British distribution, and average gross lifetime incomes in Australia, at A$906 000, were substantially higher than in Britain (A$745 000). This seemed to be due to a multitude of factors, including an earlier base year for Britain (1985 as opposed to 1986 for Australia), higher unemployment and lower education levels in Britain, and sociodemographic differences, including higher mortality, divorce and sole-parenthood rates in Britain. It is important to keep these differences in the original income distribution in mind when assessing the following results. For example, because the top 10 per cent of the Australian cohort (the group with the highest incomes) had original incomes that were 40 per cent higher than the top 10 per cent of the British cohort, it would be expected that their income tax contributions would have been substantially higher (because of the progressive taxation system). These underlying differences complicate the comparison, and only broad conclusions can be drawn about how the two welfare states appear to be redistributing lifetime income.

Some broad conclusions did, however, emerge. Total lifetime cash transfers seemed to be much greater in Britain than in Australia, amounting to A$136 000 on average in Britain but only A$65 000 in Australia. The absolute value of lifetime cash transfers received declined considerably as Australian incomes increased. In contrast, the absolute value remained relatively stable across the whole income distribution in Britain.

Cash transfers amounted to a higher proportion of gross income in Britain than in Australia for every decile. For example, cash transfers amounted to about 35 per cent of the gross income of the bottom decile in Britain and 23 per cent in Australia. For the top decile, the comparable figures were 9 per cent in Britain and less than 1 per cent in Australia. According to Gini coefficients, the British cash transfer system reduced the inequality of the original income distribution by more than the Australian system did.

Average lifetime income taxes in Australia amounted to A$237 000, compared with an average A$169 000 in Britain. Interestingly, in both countries income taxes (plus national insurance contributions in Britain) amounted to half of total tax revenue. The Australian direct taxation system looked more progressive, with average tax rates being lower for the Australian bottom decile than for the corresponding British decile but higher for the top decile. However, to some extent this apparent difference was due to discrepancies in the original income distribution against which progressivity was assessed. The direct taxation system reduced the Australian Gini coefficient by 0.059, more than double the 0.027 reduction achieved by the British direct taxation system.

It was possible to look at the extent to which receipts of cash benefits by an individual were paid for by that person at another stage in their life (lifetime intrapersonal redistribution) and the extent of net transfers from other people (interpersonal redistribution). Assuming that all cash benefits were financed from direct taxes, on average out of the A$65 000 each Australian received in cash transfers over their lifetimes, 38 per cent were effectively paid for by the individuals themselves, whereas 68 per cent were paid for by others. These proportions were reversed in Britain.

The proportion of cash transfers that represented intrapersonal redistribution increased as incomes increased. In Britain, by the third decile, the majority of the group's gross receipts were self-financed over the lifetime; the same was true by the sixth decile in Australia. Alternatively, if it was assumed that cash transfers were financed by a proportional rather than a progressive tax, the proportion of transfers that were self-financed increased from 38 per cent to 52 per cent in Australia and from 62 per cent to 71 per cent in Britain.

Thus, controlling for the greater redistributional effect of the more progressive Australian taxation system does not alter the finding that a primarily social assistance-based system (such as Australia's), with its emphasis on poverty alleviation, results in a greater degree of inter-personal redistribution of income. Conversely, a primarily social insurance-based system (such as Britain's), with its emphasis on the link between contributions and benefits, results in a greater degree of intrapersonal redistribution.

Finally, it must be acknowledged that this study examines the redistributional impact of the British and Australian systems by comparing the post-tax and transfer income distribution with the original income distribution prevailing in *each* country. An alternative method would be to simulate the rules of the taxation and transfer systems of both countries against the *same* original income distribution (that is, run the rules for both taxation and transfer systems against either the Australian or the British original income distributions). Such an exercise would provide a very interesting complement to the study presented here. However, it would not necessarily provide more definitive answers about the lifetime redistributional impact of each country's systems, as this would depend on the extent to which the prevailing taxation and transfer rules had already affected behaviour — and thus the 'original' income distribution — within each country.

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