Inequality, Living Standards and the Social Wage During the 1980s

Author:
Raskall, Phil; Urquhart, Robert

Publication details:
Working Paper No. SSEI Monograph No 3
Study of Social and Economic Inequalities
0733409482 (ISBN)

Publication Date:
1994

DOI:
https://doi.org/10.26190/unsworks/1113

Centre for Applied Economic Research • Social Policy Research Centre

STUDY OF SOCIAL AND ECONOMIC INEQUALITIES

Inequality, Living Standards and the Social Wage During the 1980s

By Phil Raskall and Robert Urquhart

SSEI Monograph No. 3

THE UNIVERSITY OF NEW SOUTH WALES

Enquiries about the Study of Social and Economic Inequalities should be directed to the Publications and Information Officer, SPRC, University of New South Wales, Sydney, NSW 2052.
Phone: (02) 385 3857 Fax: (02) 385 1049 Email: sprc@unsw.edu.au

This is the full version of a paper orginally presented to 4th Australian Family Research Conference held in Sydney on 19th February 1993.

October 1994

ISSN 1038 6270
ISBN 0 7334 0948 2

Foreword

The idea that a Study of Social and Economic Inequalities (SSEI) should be undertaken in Australia was first proposed in 1988 by the then Minister for Social Security, Brian Howe. After development of a specific research proposal, core funding for the Study was provided by the Commonwealth Department of Social Security, which also agreed to provide matching funding on a dollar-for-dollar basis for any funding received from non-Commonwealth sources. On-going encouragement and additional financial support to allow final completion of the research was provided in 1993 by Peter Baldwin who had by then assumed responsibility for the social security portfolio.

The research was conducted over the period 1990-94 under the joint auspices of the Centre for Applied Economic Research and the Social Policy Research Centre, both located at the University of New South Wales. The main aim of the Study has been to shed new light on various dimensions of inequality in Australia - both economic and social - and to investigate the factors causing them. This involved the analysis of existing data rather than the collection of new data, a task which has been facilitated by the public availability of unit record and other data collected by the Australian Bureau of Statistics.

This report addresses the role of the social wage in maintaining the living standards of Australian households and mitigating the rise in inequality in the latter half of the 1980s. The results show the important role of social wage policies over the period and highlight the way in which Medicare and other health programs, education provisions and income transfers redistribute resources within and between groups in the population. Amongst other things, the results reported here highlight how the picture of living standards which emerges from studies focusing on trends in cash income only reveals only part of the whole story.

Funding to support the research reported here was provided by the Sidney Myer Foundation (and matched by the Commonwealth). We would like to take this opportunity to thank the Foundation, and Michael Liffman in particular, for that support and for their encouragement and interest in the research.

Peter Saunders and John Nevile
SSEI Project Directors

Contents

List of Tables

List of Figures

1 Introduction

Growing concern with the social and economic implications of economic inequality over the past decade has seen a number of researchers examine trends in the distribution of income and living standards from a variety of data sources. Some have used wage statistics (Gregory, 1992; King et al., 1991; Raskall, 1993) while others have utilised more limited taxation statistics (Lombard, 1991; Raskall, 1993). For comprehensiveness and consistency most have relied on surveys by the Australian Bureau of Statistics (ABS) on income distribution (Raskall, 1992b; Saunders, 1993b) and household expenditure (Raskall and McHutchison, 1992a, 1992b) which since 1981-82 have been available in micro-data unit record form. These surveys generally occur at four-year intervals. Raskall (forthcoming b) presents and compares the data from all such sources.

Aside from drawing tentative aggregate trend conclusions limited by data availability, researchers have either looked backwards over the longer term (Saunders, 1992a), examined income changes over the life cycle (Harding, 1992), or analysed that part of the distribution defining on some basis those in 'poverty' (Bradbury and Doyle, 1992; Saunders and Matheson, 1991; Harding and Mitchell, 1992).

The common feature of these studies has been that they take the available statistics at one point in time and compare the results point to point with those from a base year. Implicitly, a consistent trend is interpolated between these points and explanations of the revealed change, based on changed demographic and economic characteristics at those two points in time, is examined. Beyond mere description, most studies examine the impact of changes in only one, or perhaps a few specific influences. These include economic growth and employment (Bradbury and Doyle, 1992), unemployment (Saunders, 1992b), or married women's earnings (Saunders, 1993a).

In aggregate terms these studies generally suggest:

- decreasing inequality from the beginning of the 1970s to about the mid-to-late 1970s, then increasing steadily from that point on and throughout the 1980s (Raskall, 1993);
- within the distribution the 'rich got richer', that is the share of the highest decile increased but so also did that of those at the bottom of the distribution, particularly in terms of after-tax incomes (Bradbury and Doyle, 1992; Saunders, 1992a); and
- since 1989-90, with recession and unemployment, inequality has in all likelihood increased further (Saunders, 1992b), particularly amongst non-individual families.

One of the difficulties in drawing more definite conclusions is that the survey results and data sources change in scope, coverage, conceptual definition, and level of data aggregation which hinders comparability and qualifies any conclusions drawn. These data limitations also dictate the period of analysis. In fact, all studies stop at 1989-90 precisely because the 1989-90 income survey results are the latest available and even these were only finally released in March 1993.

Moreover, the consequence of reliance on four-yearly interval data is usually an emphasis on medium to longer term influences on income distribution on a limited comparative static basis - either demographic changes in age and household composition or broad-brush emphasis of employment or unemployment growth. Whilst there is no denying that medium-to-long term influences on inequality are important, perhaps paramount, the consequence of these limitations is that we know very little of the short-term movements in income distribution and relative living standards. And whilst some studies have looked at the impact of inflation and cyclical unemployment on income distribution (Nevile, 1990; Saunders, 1992b), conclusions have been tentative because of data limitations or the few data points available (three per decade at most) which limit the statistical validity of results.

The other impact of this has been that the emphasis is very much on the impact of factors on inequality, rather than on examining the possibly more relevant question of the impact of inequality on other social and economic factors. Operationally, governments need to make estimates of income distribution for revenue forecasting purposes, the costing and revenue potential of policies, and, hopefully, to assess the impact on living standards and inequality of policy. By default, most estimates are based on crude extrapolations of the latest data set or track the imputed impact on hypothetical families.

More recently, concurrent with the availability of unit record data, there have been developments in what are known as microsimulations. These take as a basis the distribution of income revealed by an income survey and incorporate, from external data, changes in demographic characteristics and income received from different sources. Such models are in their relative infancy in Australia (see Gallagher, 1990), and have usually been ad hoc and policy-impact driven, that is, developed for a specific purpose to determine the distribution of income in a non-survey year for which no data are available or to test the impact of a specific policy.

A common limitation of both these survey-result trend analyses and survey-based microsimulation studies has been their reliance upon cash money income distribution (and redistribution through the income taxation and social security systems). This is partly because of the limited definition of income adopted for such surveys; excluded from private income are fringe benefits and capital gains. More particularly, in assessing the redistributive effect of government policy, they concentrate only on the cash-transfer system: the impact of income tax and social security. The impact of other components of government expenditure, notably what has been called the social wage (health, education and housing), has been largely ignored.

The exceptions to this in Australia have been the 'fiscal incidence' studies of the ABS (ABS, 1987; 1992), which utilised the Household Expenditure Surveys to examine the distribution of non-cash government benefits in 1984 and 1988-89. However, valuable though these particular studies are, they still suffer from the fact that they are point estimates - a single frame in a moving picture. Changes which can be measured are only estimates for one relatively short period, and even here conceptual differences are substantial.

Yet the dominant policy instrument of the current Government, the Statement of Accord with the Australian Council of Trade Unions, was explicitly comprehensive in that it covered

> prices, wages, **non-wage incomes,** taxation and the '**social wage**', that is expenditure by governments that affect the living standards of the people by direct income transfers or **provisions of services.** (as quoted in Norris, 1985: 212; emphasis added)

In the words of Henry Aaron (1977), the reality is that, like the unicorn, the non-redistributive state is a myth. Governments can influence inequality and living standards not merely through transfers of money through taxation and social security, but also through transfers in the form of non-cash benefits. In much the same way, people can be paid either in fringe benefits or in money wages. Arguably, also, less direct interventions into the market economy by government can affect the resultant distribution of income through both factor and product markets.

Other than occasional broad parameter estimates of their impact at particular points in time, we know little about government redistributive measures, partly because much of it occurs through an annual budgetary cycle, partly because much of it is indirect and partly because much of it **responds** to the business cycle.

This Report attempts to address the concerns outlined above by:

- providing **annual** estimates of the distribution of cash income and living standards for each year over the 1980s from 1981-82, including 'private', 'gross' and 'disposable' income concepts;
- broadening the concept of 'income' beyond these traditional cash concepts to incorporate elements of the social wage, specifically health and primary and secondary education expenditure, in calculating the annual distribution of 'final' income;
- examining the impact of these social wage elements on the distribution of disposable income and the level of living standards overall and by specific family type; and
- placing the social wage in the context of measures of redistribution available to government, vis. the taxation and social security system.

In addressing these concerns this Report draws on and extends, by operationalising over a nine-year period, the microsimulation 'model' developed at the Social Policy Research Centre, results of which have been reported upon in Bradbury and Doyle (1992) and Bradbury, Doyle and Whiteford (1990). Thus it effectively provides the data base of nine income surveys. Consequently, the potential research that may be undertaken becomes not merely vast in quantity but also in the range of avenues which were previously impossible to examine because of data limitations and which are now opened up for more rigorous analysis. Many of these we are only able to touch upon, and await more specific analysis by other researchers. That requires an assessment of priorities for reporting. Moreover, the microsimulation itself is a part of a continuous or dynamic process of development, improvement, modification and extension.

This Report falls essentially into three parts. Firstly, since the results presented are based on a microsimulation incorporating a number of consistent imputations including private income, social security, taxation and the social wage it is important that the methodology and procedures adopted are fully documented and the simulated results validated where possible. This is summarised in Section Two but outlined in far greater detail in Appendices One and Two in what we believe to be an often neglected but highly important analysis. In particular, it highlights some concerns we have with the taxation imputation data provided by the Australian Bureau of Statistics in the latest version of the 1989-90 unit record tape. Perhaps more significantly, in the context of the research philosophy of 'making good better' we highlight some of the current deficiencies and limitations of the model which are reflected in the results and their interpretation.

The second part of the Report, specifically in Sections 3 and 4, examines the results obtained for the nine-year period on **annual** cash or **money-income** distribution and living standard changes by a number of 'traditional' income concepts. These results are necessarily derived as a precursor to the addition of the specific social wage expenditure elements used to form the broader concept of income and living standards incorporating both cash and non-cash elements which are reported on in Section 3. In addition, arising out of these results specific issues critical to either further investigation of the development of the microsimulation or aspects of ancillary research are examined in Section 4, in particular the impact of dividend imputation and the links revealed with other social phenomena.

The third part of the Report, in Sections 5, 6 and 7, incorporates the non-cash income elements associated with the provision of benefits through government 'social wage' spending on health and school education. This is analysed by consideration of the distribution of these social wage components per se in Section 5. In Section 6, ascertaining the impact of their incorporation on the cash-based disposable income estimates, the distribution of annual final income is determined and resultant movements in living standards both overall and by specific income unit types are examined.

In Section 7 we examine the relative contribution that each form of government redistribution we have examined made to overall inequality and living standard change in the 1980s. Finally, in Section 8 we summarise the results obtained to date.

In summary, this Report is intended not only to present results in a wide range of important and less understood areas but also to encourage further specific research and contribute to the further development of the SPRC microsimulation in particular and the use of microsimulation as a research technique more generally.

2 Methodology and Validation

As indicated in the Introduction, the results presented are based upon a model which utilises and builds upon the microsimulation model developed at the SPRC, principally by Bruce Bradbury and Jenny Doyle, results from the operation of which have been published in previous papers emanating from the Centre (see Bradbury and Doyle, 1992; Bradbury, Doyle and Whiteford, 1990; Saunders and Matheson, 1991 and McHutchison and Urquhart, 1992). The principal features of the microsimulation are discussed in more detail in Bradbury and Doyle (1992) and Bradbury, Doyle and Whiteford (1990) and in particular in Appendix One to this report.

2.1 Methodology

Briefly, the simulation takes the results of the income distribution survey sample of 1985-86 as its base. It then, from external ABS data sources, amends the characteristics and 'ages' the sample population to reflect:

- changes in the labour-market: specifically, the participation rate and unemployment rate of single and married men and single and married women and changes in full- and part-time employment;
- changes in the age-distribution of the population; and
- changes in the family composition of the population[1].

To the amended characteristics of the population for each year, a series of 'market inflators' is applied which adjusts the 1985-86 income received from particular sources of market or private income:

- wage income, by adjustment at the micro-unit/person level based on changes in average wages of men and single and married women split by full- and part-time employment;
- dividend income, by adjustment based on the National Accounts, taking into account the effect of population growth;
- rental income, by adjustment based on the private rental component of the Consumer Price Index (CPI); and

1 Seven family, or more specifically income unit, types are delineated: single persons aged under 25, single persons aged between 25 and 64; single persons aged over 65; couples without children where the head is aged under 65; couples without children where the head is aged over 65; couples with children; and sole parents.

- investment income and self-employment income, by adjustment based on the National Accounts, with appropriate consideration of population growth.

To this resultant distribution of private income in the sample, income from social security benefits for each year based on eligibility criteria and rates is imputed. This provides a distribution of gross income. To this, after adjustment for rebates and concessional deductions, the personal income tax system actual liability for each year is imputed to determine a distribution of disposable income.

Imputation of social security benefits is based upon the TATLIB library of programs compiled by the Social Policy Research Centre Operationally, whilst most entitlement allocations are based on the take-up rates implicit in the 1985-86 actual receipt and reflect demographic and labour force status variables, changes occur both in the demographics and labour force status from the 'amendments' considered above. Actual changes in rebates are specifically included each year. Where income is a criteria for both eligibility and amount received as in means-tested allocations, annual income is used as the determinant. For social security allocations based upon voluntary application, such as the Family Income Supplement (FIS) and Family Allowance Supplement (FAS), where take-up rates may be expected to vary considerably between years, based on awareness of possible entitlement (particularly to newly-introduced schemes), estimates of such take-up rates are made as outlined in Appendix One making use of exogenously determined data and other specific studies undertaken. The allocation to specific families where such take-up rates are significantly less than 100 per cent is on a randomly-determined probability basis, reflecting both income level and extent of likely entitlement.

Imputation of the personal income tax system is similarly based on the TATLIB set of programs each year. These reflect the actual scales and thresholds applicable in each financial year, as well as specific deductions and rebates allowed dependent upon family circumstance, and are based upon the data revealed in the *Taxation Statistics* (Commissioner of Taxation, various years) applicable to each year. In general, taxable income is estimated from the gross income figure determined above, by reference to those component sources of each family's income subject to tax and average concessional deductions applied dependent upon family circumstance (for example, presence of dependent spouse) and income level (for more general deductions). To this taxable income, prospective tax liability is determined from which applicable rebates are subtracted to calculate actual tax paid, which becomes the fundamental tax concept applied for the determination of disposable income. The introduction of dividend imputation from the 1987-88 financial year was explicitly incorporated on this basis.

Finally, social wage expenditure on both current and capital outlays via both the Commonwealth budget and other governments in the areas of **health** and **school education** expenditure is allocated to particular income units based on age-related utilisation rates in the case of health (EPAC, 1987) and a simple mean average per school aged child in respect of education. This provides a distribution of what we

call final income.[2] Further details of data sources and methods used to impute the social wage benefits are outlined in Appendix One. Thus, at an individual record level there are four specific simulations: a simulation of private income; a simulation of imputed cash social security benefits; a simulation of imputed tax liabilities; and a simulation of imputed social wage non-cash benefits.

The amended sample population characteristics and income receipts are then, or at the appropriate income-concept stage, transposed into a 'population' estimate by applying appropriate weightings to each income unit in the sample. These weightings are based on the annual ABS survey data in *Labour Force Status and Characteristics of Families* (ABS, Cat. No. 6224.0).

In terms of the array of factors which might affect income inequality and its change (see Raskall, McHutchison and Urquhart, forthcoming), the microsimulation encapsulates:

- demographic changes to population, age distribution and family (income unit) composition;
- changing employment structure, as reflected in full- and part-time employment rates, male and female participation and unemployment rates;
- changing industrial structure, to the extent that these are reflected in the changing employment structure and wage and dividend income shifts;
- the 'business cycle', to the extent that this is reflected in changes to participation and employment status, and movements in wages, dividends, interest rates and inflation; and
- earnings changes and changes in income from financial assets and wealth.

In addition, changes to inequality in the form of government redistribution through income tax, cash benefit and social wage (health and school education) expenditure changes can also be examined.

Procedurally, all the adjustments to determine private income and the imputations of social security, taxation and the social wage are undertaken at the individual person level; these are then aggregated to form either income units (akin to 'families' plus independent single people) or households. In all that follows, for presentation purposes, the unit of analysis adopted, unless otherwise specified, is the 'income unit' concept.

---

2 This is different to the 'final' concept utilised by the 'Fiscal Incidence Studies' of the ABS (ABS; 1987, 1992) which additionally incorporates indirect taxes. Our definition corresponds to the 'disposable plus indirect benefits' concept that ABS utilises, although the range of such benefits that we consider is less than that considered by the ABS.

Because we are concerned with change in inequality over time, our interest is in movement beyond that merely reflecting changes in size and composition of income units. Taking the unadjusted or 'raw' income of the income unit makes no allowance for household size and composition in determining the welfare or 'living standard' of the members of the income unit. Thus a family comprising a head, non-working spouse and several children could not be regarded as having the same standard of living as a single person, living alone, on the same income. This is also the case with individual income since most individuals live in economic and social units that include others. To the extent that total resources are pooled, economic well-being cannot be measured simply by individual income. For individuals, such as dependent children, with no income, needs must be met by transfers within the income unit. Nor is the adjustment of the pooled income of the income unit to a per capita base sufficient in that it ignores the economies of scale available in multi-person units, whereby certain basic living costs (such as housing) do not vary proportionally with the number of occupants and per capita income ranking and comparison would overstate inequality experienced by units with larger than average number of dependants. Hence, to effectively compare the incomes of different units in living standard terms and to ascertain 'true' inequality, we adjust 'raw' or actual income to an equivalent income concept which explicitly incorporates factors such as the number of persons and their ages to take differences in relative needs into account. Thus, unless explicitly indicated, it is this equivalent income concept that is used for the ranking and comparison of the living standards of income units and the determination of consequent levels of inequality.

However, at times, in the interests of presentation, or reflecting a lack of full concurrence amongst the research community on the appropriateness of the equivalence scales, results are also presented on an unadjusted total income unit basis. This is particularly so when we examine each specifically identified income unit type. Such unadjusted figures also reflect the more common presentation of published ABS data which are used for validation of our results.

2.2 Deficiencies, Omissions and Limitations

The development of this model is a continuous and on-going process and we are certainly not blind to the deficiencies limitations and omissions in the model. These too are noted in more detail in Appendix One.

The principle **omissions** relate to the fact that fringe benefit income and taxation and capital gains income and taxation, as well as other aspects of the social wage notably housing and tertiary education have not been incorporated. This means that the important distributional consequences of the introduction of fringe benefit tax and capital gains tax are not included at present.

More pertinently for this paper the model as currently calibrated suffers from three major **deficiencies**.

Firstly, it does not adequately reflect changes in the distribution within factor income types. Whilst wages are separately considered dependent upon marital status and employment status (full-time and part-time), these wages and indeed all private income changes are adjusted on a mean average basis. That is, all recipients of wage or dividend income are assumed to receive the same percentage increase/decrease. Clearly, as data presented in the wage statistics and taxation statistics indicates (see Raskall, 1993), this is not the case. Whilst some attempt has been made to adjust wages on a quintile basis, analysis shows that this is still not adequate to reflect actual changes within the factor markets. Additional work is necessary to more appropriately disaggregate these 'market inflators'.

Secondly, related to this, although changes in labour market participation are incorporated, similar changes in the ownership of shares or other financial assets are not currently incorporated. The extent to which share ownership (and thus dividend income receipt) has increased or decreased or its distribution changed over the eighties is not then reflected in the model.

Thirdly, a limitation, common to all such models, reflects the inherent assumption that a 'newly created' income unit (or indeed an exiting one) for example, new couples, exhibit the same income distributional characteristics as the existing. Clearly, it is most unlikely that newly married couples will have the same mean income as existing couples. One way of overcoming this is to incorporate more dynamic life-cycle forces into the model. In the short-term, consideration could be given to decile-differentiated income unit weighting to reflect the fact that new 'entries' to the couples and other cohorts are likely to be of lower mean private income than the current ones.

Beyond this, we have some concerns about the treatment of company tax and dividend imputation. The latter is incorporated via a distributionally-based allocation of the proportion of full-franked dividends to received dividend income. However, company tax, bar the rate which determines the value for tax purpose dividend recipients, is excluded; implicitly the assumption is that shareholders bear none of the burden. However, equally we have concerns, as documented towards the end of Appendix Two, about the apparent treatment of dividend imputation in the ABS tax imputation in the latest 1989-90 survey, which suggests that shareholders bear all of the burden. These aspects could be improved by taking differential incidence of burden rates following Warren (1989 and 1991). However, the specific issue of dividend imputation raises broader issues regarding microsimulation and consistent treatment of major shifts in the tax system. These are addressed in Section 4.1. Similarly, improvements can be made to the crude allocation procedures utilised for the social wage, and take-up rates assumed for social security benefits dependent upon voluntary application such as FAS and FIS. This, though, depends upon the availability of adequate alternate data sources to those currently available.

2.3 Validation

This frank admission of the limitations of model should not detract from the results presented. Indeed, we have spent much time in attempting to validate the current results against the data revealed by the income surveys and other aggregate sources. The results of this validation exercise are more than encouraging (see Appendix Two).

Firstly, it must be remembered that the income surveys change their scope and definitions over time - a point often forgotten by some researchers who make simple direct comparisons (see ABS, 1992). One of the benefits of this microsimulation approach is that consistency over time is assured. Secondly, it must also be remembered that income survey results are just that: results of sample surveys which suffer from sampling variability. They are not the actual population results but merely estimates of them. Thirdly, it must be remembered that often apparent 'actual' data in a survey unit record tape is in fact itself only an imputation (or estimate) based on other data collected.

Despite this, a comparison of the simulated results with the recorded survey results for 1981-82, 1985-86 and 1989-90 and other data sources, at a decile level of income equivalenced for differing family composition, for **each** of the simulations of private income, taxation and social security generally produces more than acceptable results. These are comprehensively examined in Appendix Two.

As far as aggregate variables are concerned, the simulation holds up as relatively robust and consistent over time. The validation does, however, suggest that improvements in the private income module, particularly in comparison to the 1981-82 survey, and the demographic module, particularly in respect of number of children, could be further enhanced.

Distributionally, which must be the critical aspect to the validation, for those years where comparison with other published results is possible, the simulation produces acceptably close summary Gini measures for private, gross and disposable income levels, particularly for 1985-86 and 1989-90 as outlined in Table 2.1. (As in all the tables in this Report, results are reported for non-self-employed income units.) For the critical disposable income level, the simulated Gini for both these years, whether equivalent or unadjusted income is used, is within 0.001 of the apparent 'actual' result of the respective surveys. The result in 1981-82 is affected by an apparent underestimate of private income inequality, although the specific taxation and social security imputations appear adequate. These conclusions hold even if the results are examined for each of the seven identified income unit types.

In respect of the specific imputations, it must be acknowledged that despite validation at the aggregate income concept levels, the comparison of the specific tax imputation in 1989-90 is disappointingly different from the imputation estimated for that year by ABS in its final release unit record tape. This is not to say that the microsimulation produces incorrect or false results but rather that the results

Table 2.1: Comparison of Simulation with Surveys, Income Distributions, Gini Coefficients: 1981-82, 1985-86 and 1989-90

	Survey	Simulation	Simulation/Survey (%)	Simulation Less Survey
		Unadjusted (Non-equivalent) Income		
1981-82				
Private	.495	.513	103.6	+.018
Gross	.392	.418	106.6	+.026
Disposable	.348	.368	105.8	+.020
1985-86				
Private	.524	.525	100.2	+.001
Gross	.416	.416	100.0	-
Disposable	.361	.360	99.7	-.001
1989-90				
Private	.529	.526	99.4	-.003
Gross	.429	.417	97.2	-.012
Disposable	.375	.376	100.3	+.001
		Equivalent Income (OECD Scale)		
1981-82				
Private	.476	.487	102.3	+.011
Gross	.352	.370	104.1	+.018
Disposable	.304	.316	104.0	+.012
1985-86				
Private	.505	.504	99.8	-.001
Gross	.373	.373	100.0	-
Disposable	.315	.314	99.7	-.001
1989-90				
Private	.502	.501	99.8	-.001
Gross	.382	.372	97.4	-.010
Disposable	.324	.324	100.0	-

produced by the **consistent** imputation in the model differ from the results of the, as yet undocumented, ABS imputation. Appendix Two addresses the concerns at a conceptual and operational level we have with the ABS results.

As far as the social wage imputation is concerned, appropriate comparison with the results of the Household Expenditure Survey (ABS, 1992) reveals close correspondence. Even at a decile share level the results are encouraging. At the cash-income level, taken together, the simulation undertakes in effect three specific imputations: private, social security and taxation for the ten equivalent income deciles for the three ABS Income Distribution Survey comparable points in time. That is, a total of 90 possible decile comparisons can be made with the results of an

actual survey (in 70 of the 90 cases), or other imputations incorporated in the 'actual' results (for the other 20 cases - taxation in 1981-82 and 1989-90). The comparison reveals that in 24 cases the decile percentage income share estimated from the simulation is, on a relative basis, within 1 per cent of the revealed 'actual' imputation and over half are within 5 per cent.

If we exclude the other external imputation estimates so that comparison is solely with survey respondent results, then one-third of the microsimulation imputations are within 1 per cent and two-thirds within 5 per cent. When it is recalled that many of the discrepancies by income share are linked to a discrepancy in one decile only, and that discrepancies at one imputation level, such as private income, will translate into other levels, particularly tax, then this result is highly encouraging.

This outcome is all the more encouraging when we recognise that for many comparisons where the relative 'error' may appear large, the absolute discrepancy is minor. For instance, the 1981-82 simulation estimate for private income in the second decile would appear to be 26.67 per cent out when compared to the actual 1981-82 survey. The magnitude of such a disparity is reduced somewhat when it is revealed that the survey estimates 0.19 of one per cent as the private income share of that decile, compared to the 0.15 of one per cent estimated by the simulation - an absolute discrepancy of 0.04 percentage points. Over one-half of those decile estimates which are in discrepancy by more than 5 per cent in relative terms involve an absolute discrepancy of less than 0.1 of one percentage point.

In summary, when the distributional outcomes are examined on a decile equivalent income basis then the source of the discrepancy from the 'actual' survey results (aside from minor fine-tuning as indicated) stems either directly or in consequence of two results: the overestimate by the simulation of private income of the top decile in 1981-82; and the apparent underestimate of the taxation payments of the top decile in 1989-90 as compared with the ABS tax imputation.

The former occurs as a result of the inability of the microsimulation to predict the shift in share-ownership (and hence dividend income) between 1981-82 and 1985-86 (see Raskall, McHutchison and Urquhart, forthcoming) and changes within the distribution of wage and salary income in the period. The latter discrepancy is in fact not one of difference from **actual** survey recorded results but stems from the differences in two imputations of tax liability. For the remainder of the results the simulation produces outcomes which suggest that the results obtained would have a high degree of validity.

In summary, the simulation incorporates changes in labour force participation, full- and part-time work, unemployment, average wages, dividend, interest and rental income as well as age and family composition. It does not, in its present formulation, incorporate changes in private/market income inequality stemming from changes in the distribution within factor markets, that is in the distribution of full-time wages amongst men and women, part-time wages, or in the distribution from capital market.

Two final points in relation to the results presented should also be noted. Firstly, because of the unreliability, due to tax minimisation and evasion, of self-employment income data (see Pissarides and Weber, 1989, in respect of the United Kingdom), as well as differential treatment under the tax and social security systems, the results presented here relate **only** to **non-self-employed income units.** That is, income units in which either the head or spouse received income from self-employment have been excluded.

Secondly, the data utilised relates to annual income over the year rather than 'current' income at the time of survey. Whilst the latter might be preferable for determination of eligibility for social security (King, 1987), it is deficient in respect of calculation of liability for taxation, which is based on annual income. The distributional significance of this becomes evident if comparison is made between the recorded tax liabilities of the HES based on current income and the imputed liabilities of the HES fiscal incidence studies. Moreover, the concept of 'current' income as used for income surveys is a misnomer in that whilst wage income is current as of time of survey, non-wage income is the weekly equivalent of the last recorded annual financial year income. Thus, the concept is more of a hybrid. For consistency purposes, annual income has been adopted for use in the annual simulations.

Overriding all this, of course, is that this microsimulation is a static simulation looking backwards and forwards; that is, it is primarily a tool for filling in the gaps of descriptive research. At this stage, it does not encompass any behavioural response which would be necessary for our results to have greater applicability in policy evaluation. However, on such a static basis, we are confident, subject to the limitations recognised above, that the results obtained through the simulation and the consequent interpretation of those results, reflect the annual movement of both the cash-based income concept measurements of inequality and living standard changes **annually** from 1981-82 to 1989-90 and the impact of incorporating social wage allocations of health and school education.

3 Inequality and Living Standards on Cash Income Basis

Unlike poverty analyses, which concentrate on the lower tail of the distribution on either an absolute or relative basis, inequality analyses examine the changes that occur over the entire distribution.

Whilst it has long been recognised that poverty is a significant cause of social problems, particularly related to health and crime, the most recent work indicates a strong or stronger correlation between the incidence of crime (Weatherburn, 1992) and health (or rather ill-health) (Wilkinson, 1992) and levels of economic **inequality.** This strengthens the view of poverty as a relative phenomenon. Poverty only exists because wealth (in its classical sense of high-income) does. They are two sides of the same coin, or as Tawney (1913) eloquently put it:

> What thoughtful rich people call the problem of poverty, equally thoughtful poor people with equal justification call the problem of riches. (Tawney, 1913: 63)

In consequence, measurements of changes in the distribution of income are, or perhaps should be, central to the evaluation and formulation of economic and social policies, and important indicators of the success, or otherwise, of government policies and society in achieving widely-held goals of equity and efficiency.

To quote Hewson (1992):

> No system of government can survive indefinitely if society is split into a privileged wealth class and a permanent underclass. That would be the ingredients for instability, civil disruption and revolution. (Hewson, 1992)

The definition of income, and what is included or not, clearly matters, as do movements in inequality and relative and absolute living standards as measured by that definition.

3.1 Definition of Income

Most income definitions take as their base point the notion that in a market economy, well-being is measured by people's capacity to participate in product markets through the medium of money. This materialist minimal position posits that 'cash-only' counts and income is measured by the flow of cash receipts in a period of time, generally a year. Other definitions extend this basic concept, in a material well-being sense, to include receipts in an 'in-kind' or 'non-cash' form on the basis that receipt of goods and services 'frees-up' other cash receipts to participate in the markets and thus enhances people's material well-being. Other definitions go

beyond this to include the services provided annually from the existing stock of non-cash income bearing assets, such as the imputed rent on owner-occupied housing. More broadly still, the definition, to reflect 'truer' well-being can be extended to non-pecuniary aspects such as access to leisure, the environment (and its quality), working conditions, social interaction, living conditions and 'quality of life' indicators to concepts of felt and expressed happiness. (For a discussion of the philosophical basis of such concepts and an attempt to operationalise 'broad' income in Australia see Travers and Richardson, 1993).

Unfortunately, as we move beyond the 'cash-only counts' concepts the exercise becomes fraught with methodological dilemmas and operationalising difficulties. The data requirements for a representative sample become more extensive (and costly), consistency more difficult to attain and interpretation of results more uncertain.

Hence, official statistics concentrate and present data on a 'cash-only-counts' basis, from a semi-regular set of sample surveys. As indicated earlier the exception to this in Australia are the two 'Fiscal Incidence' studies conducted and reported by the ABS from their Household Expenditure Surveys (ABS, 1987 and 1992). Thus, in general in Australia the ABS Income Surveys define income as the sum of cash amounts received annually from wages and salaries, own business and partnerships, interest, rent and dividends, government pensions and benefits and other regular payments such as superannuation and maintenance, that is, regular money-sums. This also applies to official statistics overseas so that, based on data realities, the relatively consistent cash-only concept dominates in considerations of the distribution of income and its change over time as a social and economic indicator. For recent examples, see Atkinson (1993), Saunders (1993b), Bradshaw (1993), and Raskall (1993).

Even this minimal concept with its perceived benefit of consistency becomes fraught with problems, particularly for international comparative work, as different official collecting sources adopt different definitions and treatment of various 'income' sources. The Luxembourg Income Study, in which Australia is a participant, was established to ensure international comparability of basic data for such comparative work. Even within nations, changes in definition, treatment, range and sample scope can impair interpretation of trends over time.

Subject as it is to all these caveats (which expand as the income definition is broadened), the basic 'cash-only' definition of income dominates as the fundamental measurement of income, and has been utilised as such by the ABS.

Unfortunately, as indicated in the introduction, the cost and resources required to produce such data means that, in Australia at least, surveys are currently conducted once every four to five years. In the 25 years since the ABS began undertaking these income surveys on a regular basis, six only have been produced. To this we should add the four Household Expenditure Surveys and a number of ad hoc surveys for various purposes which also included income as an item of data collection. However, because these are designed and undertaken for other reasons than

examination of the distribution of income, differences in methodology and scope hinder comparability.

The benefit of the microsimulation approach (if validated) is firstly its capacity to provide absolutely **consistent** results over time and secondly its capacity to generate results on an **annual basis** (to fill in the gaps between the surveys). This enables a truer indication of movements in economic inequality as a performance measure of social and economic policy particular if 'social justice' is to be, at least in rhetoric, a goal of government and society. This section outlines the changes in this basic money-only measure of economic inequality during the 1980s, based on the simulation.

Prior to reporting these, though, we need to ensure a valid basis for comparison, if we are to compare levels of 'true' inequality and its change. As indicated in the previous chapter, to extract changes in inequality at an overall income unit level beyond those merely arising from changes in family size and composition, we utilise the concept of 'equivalent' income, that is, income adjusted by an equivalence scale which reflects differing family needs based on size and presence of dependent members. For the purposes of this paper, we have taken the equivalence scale recommended by the OECD (1982).[3]

Beyond its mere definition, income inequality can be considered at a number of levels utilising different concepts of income. Private or market income refers to that income received through the exchange of factors of production be they labour or capital. Thus it includes wages plus income from capital in its various forms - dividends from shares, rent from real estate, and interest from other investment accounts usually held in financial institutions. It also includes any other income received on a regular basis from non-government sources, including superannuation. Thus it refers to the income distribution derived from the market-exchange economy that occurs in the private sector. Wages received by public sector employees, interest received on public sector debt or dividends received from part-privatised government enterprises are also included here. Private income distribution could be considered as primary inequality. To this, government redistributes income explicitly through a number of mechanisms. Principal of these are direct cash transfers through the social security system and the income taxation system, and indirect transfers through the provision of expenditures on health, education and other government services (specific users of which receive benefits at a subsidised rate, including 'free').

Gross income adds social security pensions and benefits to the market or private income receipts and thus represents the cash income potentially available for people

---

3 In this scale, the first adult is given a value of one; the second and subsequent adults, a value of 0.7 and all dependants a value of 0.5. In comparison, the other widely-used equivalence scale used in Australia, the Henderson scale, developed by Professor Ronald Henderson in the Poverty Inquiry (1975) broadly weighs an additional adult at 0.7 and dependants as 0.2. Thus, the OECD scale gives greater weight to dependent children.

to participate in the product markets as consumers. However, to pay for such social security and other forms of expenditure, government levies taxes, including taxes on that gross income received. Not all income is subject to taxation and a number of rebates and deductions are allowed. After the application of these taxes, individuals within income units are left with a disposable income which represents what they have available to actually spend each year. It is this concept reflecting after-tax income in people's hands which is generally accepted as being the most applicable cash-income concept for ascertaining either living standards or inequality.

For these tax payments, however, individuals receive from government not merely direct cash transfers through the social security system. In addition, the government provides a wide range of government services. Beyond the provision of national defence and a series of regulatory functions, the government provides a number of other services. They are provided at a subsidised rate or free to the users, often on the basis of some tacit or unwritten right to ensure that access is denied to none merely because of an income constraint. Notable amongst these are health and education (which are the subject of this report) but they may also include a wider range of what has become known, through its industrial relations origins, as the social wage (see McHutchison and Urquhart, 1992). These non-cash benefits, received in kind, can be considered as a further form of income and are incorporated in the 'final' income concept, considered in the later sections.

In this section we concentrate on the three cash income concepts: private or market, gross and disposable, and the elements of government redistribution inherent in them, social security cash receipts and income tax payments.

3.2 Simulation Results: Gini Coefficient

Overall Results

The simulation results for the distribution of equivalent income, across all income concepts for each year as measured by the Gini coefficient are outlined in Table 3.1. The results are presented for the three concepts of income: private, gross, and disposable. Figure 3.1 presents the results graphically. In interpreting Figure 3.1, it should be recognised that whilst the relative scale reflecting changes in the Gini is the same for each concept, the absolute starting value differs. Thus, for private income the left-hand scale ranges from .480 to .510; for gross income, from .360 to .390; and for disposable from .310 to .340. Accordingly, the actual difference in the Gini coefficient between the concepts is the difference on the graph plus the fixed scale difference. In consequence, the impact of any particular element of redistribution, such as social security or taxation, is reflected in both the magnitude and differential directional movement in the two relevant concepts incorporating the additional element. For example, the impact of the social security system is reflected in the difference between 'private' and 'gross' (plus, of course, the fixed value scale difference of .120). The reason this has been done is purely for ease of

Table 3.1: Simulated Income Distributions, Gini Coefficients: 1981-82 to 1989-90

Year	Equivalent Income[a]		
	Private	Gross	Disposable
1981-82	.487	.370	.316
1982-83	.505	.376	.323
1983-84	.509	.375	.319
1984-85	.509	.372	.315
1985-86	.504	.373	.314
1986-87	.509	.377	.316
1987-88	.508	.375	.327
1988-89	.502	.373	.330
1989-90	.501	.372	.324

Note: a) OECD scale, non-self-employed income units.

comprehension. On a single scale, the (fixed) differences are too large and hide significant movements.

Several points become apparent from examination of this table and figure:

- a dramatic increase in private income inequality which occurred between 1981-82 and 1982-83, the final year of the previous Liberal National Party government. However, care should be taken not to extrapolate this over the period of that coalition government, and note should be taken that largely through the influence of the social security system, the rise in post-redistribution inequality was not as large. The increase in inequality is more readily attributable to the recession which occurred in that year. However, the increase in private income inequality did not disappear as the economy came out of its recession;

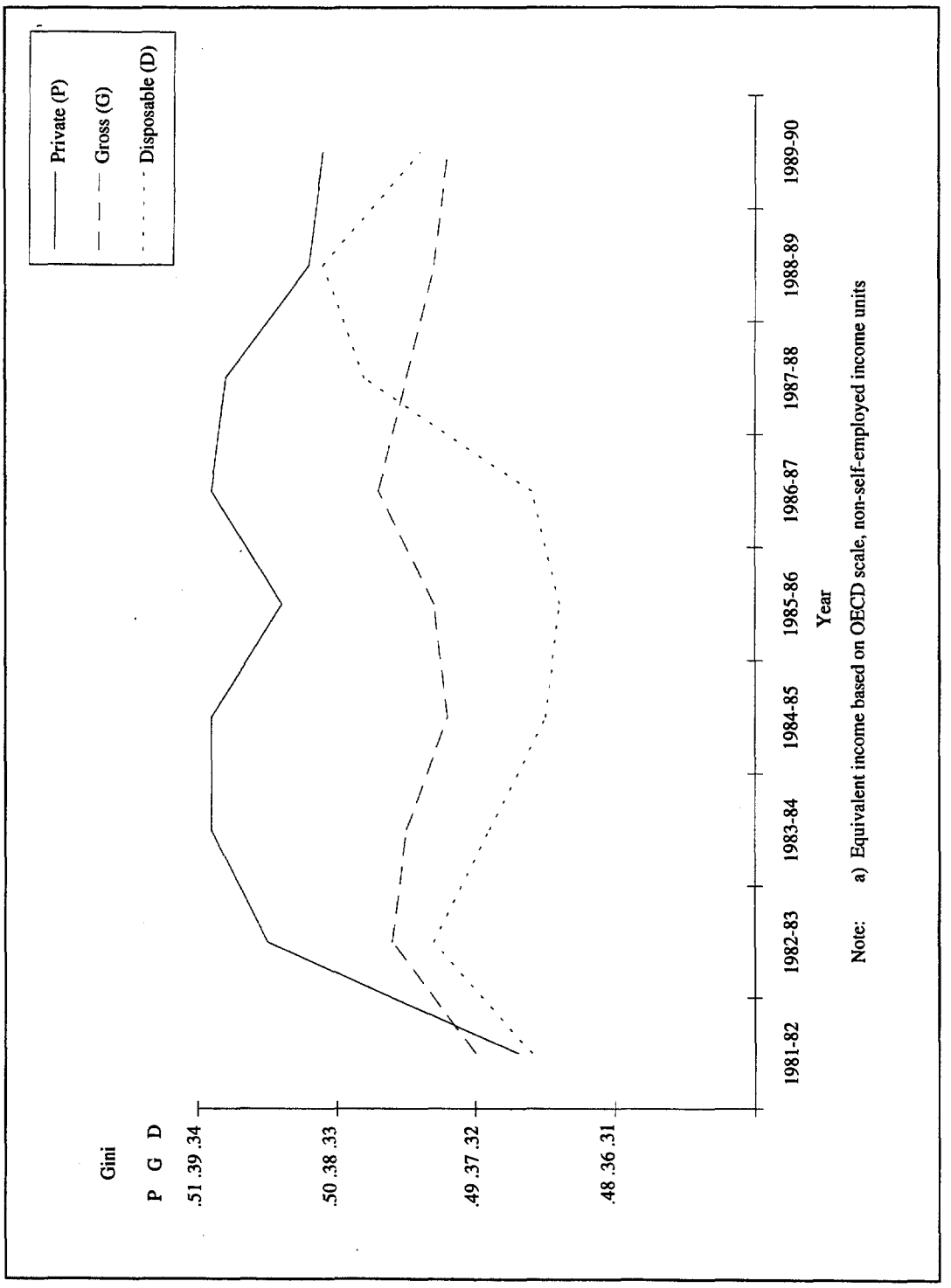
- the impact of the social security system in mitigating or 'evening out' fluctuations in private income, reflected by the difference between Private and Gross;

- the apparent inequality-exacerbating impact of the tax system reflected in the larger amplitude of movements in disposable income inequality compared to the gross income concept; and

- the wave-like pattern of economic inequality after all elements of government redistribution. Inequality peaked in 1982-83 and again in 1988-89. Between those years it followed an almost perfect U-shape, with a slight upward trend.

Related to this final point it is notable that the peaks in disposable income inequality pre-date in the case of 1982-83, and post-date, in the case of 1988-89, the peaks of private income inequality, and that the amplitude of fluctuations in post-government

Figure 3.1: Simulated Income Distributions, Gini Coefficients: 1981-82 to 1989-90



cash transfers is greater than that reflected in private income fluctuations. This suggests that government redistributive activity has become more significant as a determinant of money income inequality and relative living standards.

Looking at Figure 3.1 and Table 3.1 in more detail, in 1982-83 it was the social security system which primarily acted to reduce the dramatic surge in private inequality, with taxation following suit in mitigating that rise.

In 1983-84, despite a continued (though lesser) increase in private inequality, the government redistributive mechanisms led by the social security system succeeded in turning post-redistribution inequality around. With the addition of the other form of government activity, in taxes, the rate of decline in inequality increased. This process continued in 1984-85, where the dominant contributor (reflected in the greatest relative slope in Figure 3.1) became the taxation system.

By 1985-86, with the fall in private inequality, the concomitant actions of the social security system acted to reverse this at the gross income level, although the operation of the taxation system restored this decline at the disposable income level. The net reduction in post-government inequality was less than that at the private income level.

Inequality began to increase again in 1986-87 at the private income level. This time, though, the nature of the increase was such that, unlike in 1982-83, the social security system did not lessen the rate of this increase. This task was left to the taxation system.

In 1987-88, inequality was declining at the private income level, reflected also at the gross level, as the social security system became redistributively passive. However, conversely the operation of the tax system acted in that year to dramatically increase disposable income inequality.

Again in 1988-89, private income inequality continued to decline (more rapidly) as employment growth made an impact. Whilst the social security system mitigated this decline, as people found employment (both full-time and part-time), again the tax system operated to increase inequality at the disposable income level.

In 1989-90, the rate of decline in private inequality slowed markedly, and whilst the social security system increased this rate of decrease (possibly through the introduction of the 'Family Package'), it was changes in the tax system that contributed to the rapid decline in disposable income inequality notable in both Figure 3.1 and Table 3.1.

In summary over the period, two notable features stand-out:

- the mitigating influence of the social security system in dampening dramatic changes in private income inequality particularly in the early part of the decade;

- the strong impact of the income tax system in sustaining this decline in inequality the middle of the period of analysis; and conversely,

- the seemingly perverse impact the tax system had in dramatically contributing to the large increases in inequality in the years 1987-88 and 1988-89, and, in general, contributing far less to redistribution in the latter years of the decade.

In relation to the final point, it should be noted that the simulation does not, at present, incorporate the fringe benefits tax and the capital gains tax - the two important base-broadening measures introduced in 1987 following the 1985 Review into the Australian Taxation System. As Raskall (1992a) and the *Taxation Statistics* show, both these measures are likely to impact most upon higher income earners and thus mitigate this apparent reduced redistributive impact of the personal income tax system, although the extent to which this is the case has yet to be fully examined. With that caveat, however, the personal income tax system, in terms of regularly received cash income, per se, became significantly less progressive and in relative terms, actually led to an increase in inequality in 1987-88 and 1988-89. Whilst this partly occurred as a consequence of 'flattening-out' of the rate structure it was principally the result of the introduction of dividend imputation, which effectively made that source of income tax-free in the hands of individual recipients.

Thus, over the entire period, comparing 1981-82 to 1989-90, private or market inequality increased substantially. However, in interaction with the social security system, this increase was far more limited at the gross income level. With changes to the tax system, however, disposable income inequality increased significantly, particularly in the last three years, though not by as much as the private inequality increase. However, a large proportion of this change in private income inequality occurred in the year from 1981-82 to 1982-83 as the economy entered recession. In fact, on the simulation results, despite fluctuations, private inequality fell between 1982-83 and 1989-90, as did gross income inequality. The changes to the tax system referred to above acted to restrict this decline at the disposable income level.

These conclusions are borne out by Table 3.2 which outlines the contribution to the change in inequality each year in the absolute value of the disposable income Gini coefficient, from each income concept and each component of government activity from the level in the previous year.

The table shows that between 1981-82 and 1982-83, private inequality as measured by the Gini increased by 18/1000 or .018. The social security system acted to restrain this by 12/1000 so that gross income inequality only increased by 6/1000. The income tax system changes operated to further increase inequality by 1/1000, so that disposable income inequality increased by 7/1000. In all but three of the years examined, the directional impact of the social security system was in the opposite direction to the change in private income inequality. In those three exceptional years (1984-85, 1987-88, and 1989-90) it acted to further reduce inequality. On the other hand, the tax system in 1987-88 and 1988-89 acted to dramatically increase inequality at the disposable income level beyond the change exhibited at the gross

Table 3.2: Absolute Contribution of Government Taxes and Transfers to Annual Change in Disposable Income: 1981-82 to 1989-90

Year	Private[b]	+ Social Security	= Gross	- Income[a] Tax	= Disposable	- Government Cash Transfer (Social Security Plus Income Tax)
1982-83	+18	-12	+6	+1	+7	-11
1983-84	+4	-5	-1	-3	-4	-8
1984-85	0	-3	-3	-1	-4	-4
1985-86	-5	+6	+1	-2	-1	+4
1986-87	+5	-1	+4	-2	+2	-3
1987-88	-1	-1	-2	+13	+11	+12
1988-89	-6	+4	-2	+5	+3	+9
1989-90	-1	0	-1	-6	-7	-6

Note: a) Income tax refers to personal income tax and excludes fringe benefits tax and capital gains tax.
b) Private income excludes fringe benefits and capital gains.

Source: Derived from Table 3.1.

level. Thus, in 1982-83 it was the private income/social security interaction at the gross income level that contributed most to the revealed disposable income inequality increase. In 1983-84, the predominant factor was the reduction in inequality through the operation of the tax system, and in 1984-85 it was the outcome of changes in the impact of the social security system. The principal contributor to the overall reduction in 1985-86 again became the tax system, whilst the increase in private income inequality in 1986-87 was of such magnitude as to swamp any inequality-reducing contributions of changes in government redistributive activity. In 1987-88, the massive contributions of changes in the tax system has already been noted. In 1988-89, despite a decrease in private income inequality, all three areas of government redistribution contributed to the inequality increase. Finally in 1989-90, the reduction in cash-money disposable income inequality was brought about principally by the changes emanating from the tax system.

Over the entire period, as measured by the simulation, changes in private inequality increased in three of the eight periods of annual change, notably between 1981-82 and 1982-83 and the following year (referred to as '1982-83' in Table 3.2). It should be noted that this would reflect changes in the labour market including participation rate changes, full- and part-time employment changes and **average** wage changes by each category of combined employment, gender and marital status. It does not measure changes in the **distribution** of those wages within those categories. Similarly the simulation reflects changes in average income from capital but not changes in either the distribution of those incomes or changes in the pattern of

ownership of that income-receiving capital. As noted in Appendix Two we have some concerns about these within-group distributional shifts particularly in the trend period from 1981-82 to 1985-86. These concerns are confirmed by Raskall, McHutchison and Urquhart (forthcoming) who conducted a number of decomposition analyses on overall inequality (as revealed by the Household Expenditure Survey data source) by a variety of socio-demographic variables and income sources. This indicates the increasing significance of within-group inequalities to overall inequality in the period. For that reason we address this issue further in the next section. It should also be noted that in using equivalent income, we have taken out of consideration any changes in the apparent unadjusted inequality due to changes in the size and composition of the income units of analysis.

On the other hand, the impact of changes in government cash transfers (fully incorporated in the model) and their impact on disposable income inequality is subject to much less ambiguity in its interpretation. In Table 3.2, the final column indicates the combined effect of income tax and social security. In every case, bar two separate annual periods, the change in impact of these two cash transfer systems in combination acted in the reverse direction to the apparent change in private income inequality. These exceptions relate to the period between 1983-84 and 1984-85, and 1988-89 and 1989-90, where either minimal or no decline in private inequality was accompanied by more substantial declines at the disposable income level in response to changes in the social security or taxation systems. In the earlier year it was primarily social security transfers and in the later years, the taxation changes which brought this about.

However, the most startling result is the increase in disposable income inequality contingent upon changes in the taxation system, in particular, in the period from 1986-87 and 1988-89.

Income Units

Aside from overall changes in inequality, as measured by the Gini coefficient, we are able to distinguish changes within each income unit type. Table 3.3 presents the Gini coefficient for each year for each income unit type for the distribution of disposable income. This has not been adjusted by the OECD equivalence scale. In general the pattern revealed is broadly similar to that described above for all income units: a rapid increase to 1982-83, a U-shape change to 1988-89, and then a decline in 1989-90. However, closer examination of Table 3.3 reveals several subtle variations for particular income unit types. It would appear that the impact on inequality of a variety of economic factors affects different income units at different rates and different points in time.

Amongst sole parents, inequality consistently declined over the period, so that the level of inequality in 1989-90 is some 7.7 per cent lower than in 1981-82. In contrast, all other types exhibit an increase over the period. Even there, though, the

Table 3.3: Disposable Income Distribution by Income Unit Types, Gini Coefficients: 1981-82 to 1989-90

Year	Single <25	Single 25-64	Single 65+	Couple No Children <65	Couple No Children 65+	Couple With Children	Sole Parent	Overall Unadjusted
1981-82	.282	.315	.217	.277	.245	.219	.313	.368
1982-83	.299	.322	.218	.283	.246	.228	.313	.373
1983-84	.297	.318	.211	.282	.239	.225	.305	.369
1984-85	.294	.313	.205	.278	.234	.219	.296	.361
1985-86	.288	.307	.216	.275	.244	.226	.293	.365
1986-87	.291	.308	.219	.277	.247	.226	.293	.365
1987-88	.291	.326	.217	.292	.250	.246	.292	.377
1988-89	.285	.328	.228	.301	.262	.255	.288	.384
1989-90	.289	.324	.232	.286	.264	.236	.289	.374

patterns are different. For young (under 25 years of age) single person income units, the impact of the 1982-83 recession on inequality amongst them was particularly severe. From its lowest level in the nine-year period under analysis in 1981-82, inequality reached its highest point by 1982-83. On the other hand, inequality amongst the elderly was at its lowest in 1984-85 and increased consistently to its peak at the end of the period in 1989-90. Particularly notable was the large increase in 1988-89.

Whilst inequality at the disposable income level for couples with children was similarly at its lowest in 1984-85 (matching the Gini for 1981-82), it peaked earlier in 1988-89, following a large jump in 1987-88, before falling significantly in 1989-90. This similar pattern of decline in 1989-90 from a peak in 1988-89 occurred also for both middle-aged (head aged between 25 and 64) single people and working age couples without children. However, both these income units exhibited their lowest level of inequality in 1985-86, the year after that for couples with children. These are the only two income unit types to exhibit the same two years of peak and trough in level of inequality.

As an illustration of the differential impact on inequality amongst specific income unit types, and in view of the more recent recession since 1990, we can examine the change from 1981-82 to 1982-83 in consequence of that economic recession. Overall, inequality increased from .368 to .373 or 1.4 per cent.

From Table 3.3, as expected, there was very little change in inequality of those only marginally in the workforce and reliant upon social security - single people, couples over 65 and sole parents. For the other groups, disposable income inequality

amongst both single middle-aged people and working age childless couples, the Gini coefficient increased by 2.2 per cent. However, for couples with children the increase was .009 or 4.1 per cent. For young single people the Gini coefficient increased by .017 from .282 to .299, or by 6.0 per cent. This was nearly four times the overall impact reflecting the severe impact of the recession on certain young people.

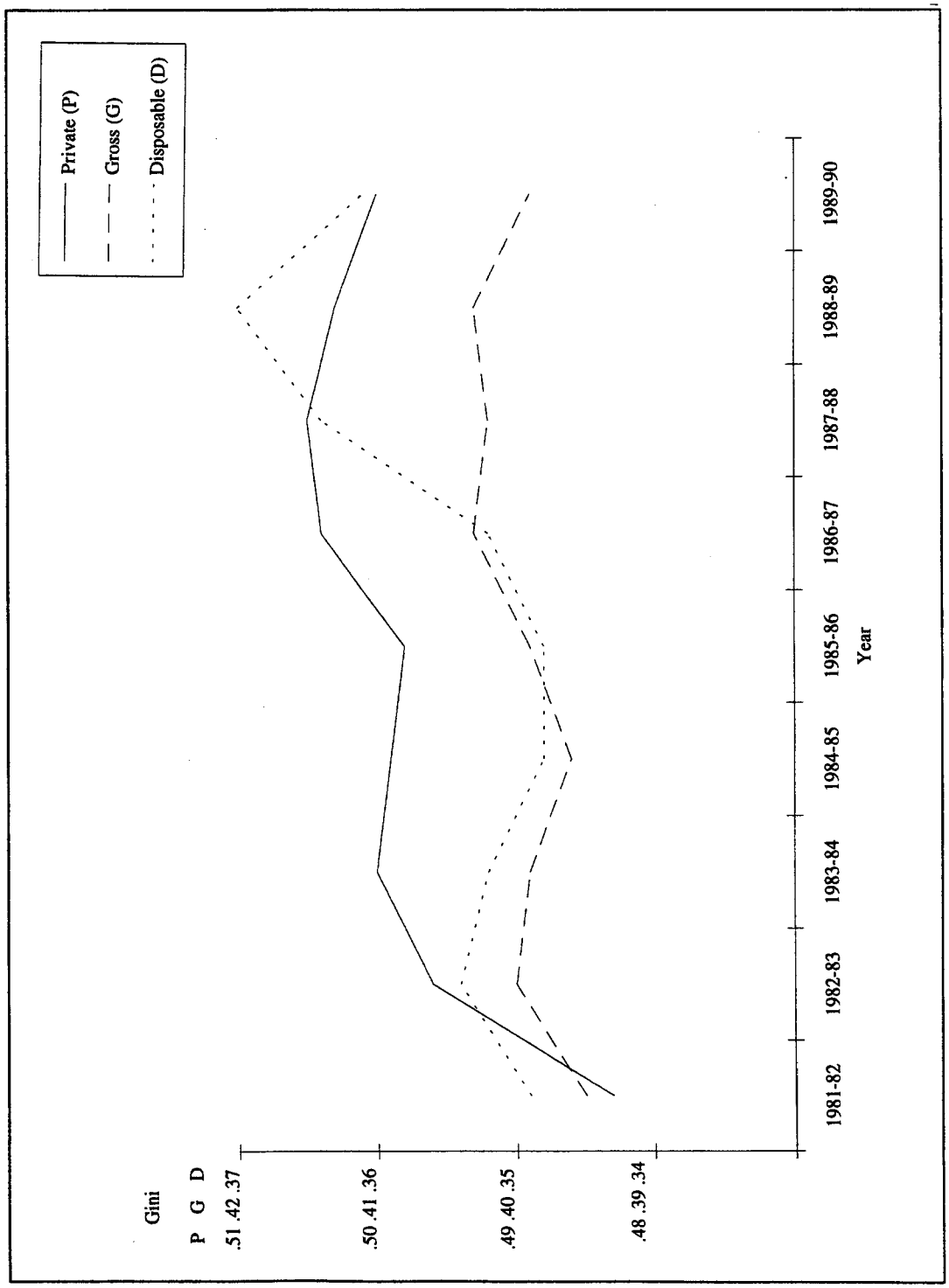
If we exclude this 1981-82 to 1982-83 period, then between 1982-83 and 1989-90 inequality **within** young single person income units and sole parents fell, but rose amongst all the other groups considered.

- We note in passing that the pattern of disposable income inequality revealed over all income units unadjusted by equivalence scales strongly reflects the pattern exhibited by total equivalent income distribution at the disposable income level, peaking first in 1982-83, then declining to a nadir in 1984-85, rising dramatically to an even higher peak in 1988-89 before declining again in 1989-90. Three points, however, are notable. Firstly, the rate of decline overall in 1982-83 was less dramatic in unadjusted terms than in equivalent terms; secondly, the 'trough' or period low point of inequality occurred a year earlier and its movement in and out of this was more pronounced; and, thirdly, the increase in inequality between 1987-88 and 1988-89 was more dramatic (as was the decline through 1989-90) in the unadjusted series compared to the equivalenced income distribution. This suggests some underlying movements in family structure size and composition over the period possibly related to the changes in inequality.

Households

In response to these possible socio-demographic influences, the simulation has also been carried out for households (defined as all persons residing at one dwelling). The plot of the resultant Gini coefficient over time, again on unadjusted disposable income, is detailed in Figure 3.2. Of interest here is that when the unit of analysis is expanded then the U-shape apparent in the income unit analysis displays a strong upward trend. This confirms the data revealed by the recorded HES results, which although based on current, rather than annual, income data display an increase in inequality in excess of that revealed at income unit level. That the simulation incorporates a similar pattern, not only enhances its validation but is suggestive of an important structural aspect of inequality in Australia. That is, both recorded results (see Raskall, 1992) and this simulation indicate that the larger the unit of analysis, the greater the apparent increase in inequality since the mid-1970s and in the 1980s in particular. The question is whether this is evidence indicative of the formation of an 'underclass' in Australia as the impact of economic change is such that the family structure serves to exacerbate rather than mitigate inequality shifts at the individual level.

Figure 3.2: Simulated Income Distributions by Households, Gini Coefficients: 1981-82 to 1989-90



3.3 Simulation Results: Income Shares

At this point in the discussion an important caveat should be placed on the results to date. We have used the Gini coefficient as an indicator of levels of inequality. However, we cannot **unambiguously** say that increases in the Gini coefficient indicate greater inequality, for the entire period under analysis. This is because during the last half of the decade the Lorenz curves intersect. That is, the transfers apparent in changes in income shares are not clear-cut transfers from high to low income earners or vice-versa. Rather, since 1986-87, lowest and highest income earners have gained at the expense of the remainder. Moreover, the Gini coefficient by its derivation is more sensitive to changes in the middle rather than the ends of the distribution.

To appreciate the nature of the inequality change in more detail, we need to look at the income shares of different deciles over the 1980s. Table 3.4 shows the decile and other shares of equivalent disposable income each year. The pattern revealed is quite diffuse.

The results show that each decile reached its peak share at very different times during the decade.

In particular, it can be seen that the 1982-83 recession impacted most on the share of the first, fourth, fifth and sixth deciles. Thus, for the lowest two deciles 1982-83 represented their lowest share for the period of analysis. Whilst these two, as well as the third and fourth deciles recovered share in either 1984-85 or 1985-86, as overall inequality measured by the Gini coefficient declined, the fifth decile continued to lose share (although it, too, recovered in 1985-86). Conversely, in consequence of the 1982-83 recession, the shares of the eighth, ninth and tenth deciles increased. From that point until the middle of the decade the shares of the top quintile decreased.

In the latter half of the decade, the shares of most of the bottom nine deciles showed a decline before recovering in 1989-90. The bottom and fourth deciles first resisted this decline and began to increase in 1988-89. The tenth decile, on the other hand, increased its share dramatically, and solely, between 1985-86 and 1988-89, before declining in 1989-90. Of particular note is the dramatic rise from 22.79 per cent in 1986-87 to 24.13 per cent in 1987-88.

Thus, an examination of the bottom two rows of Table 3.4 indicates that movements in the share of the top quintile (and the top decile in particular) are closely associated with changes in the Gini. This suggests that it was changes at the top rather than the bottom that were the critical forces determining changes in overall inequality as measured by the Gini coefficient. Analysis by Raskall, McHutchison and Urquhart (forthcoming) specifically of inequality change by decomposition analyses using Household Expenditure Survey data from 1984 and 1988-89 confirms this and highlights the importance of changes in dividend income and its distribution.

Table 3.4: Simulated Equivalent Disposable Income Distribution, Decile Shares, Percentages: 1981-82 to 1989-90

	Year								
Decile	81-82	82-83	83-84	84-85	85-86	86-87	87-88	88-89	89-90
1	2.80	2.70	2.77	2.87	2.88	2.83	2.82	2.88	2.89
2	4.78	4.75	4.88	5.00	4.93	4.95	4.87	4.81	4.82
3	5.48	5.43	5.53	5.60	5.54	5.54	5.43	5.40	5.46
4	6.62	6.48	6.49	6.51	6.51	6.47	6.32	6.33	6.43
5	8.03	7.86	7.81	7.79	7.85	7.79	7.62	7.60	7.72
6	9.50	9.39	9.33	9.31	9.42	9.39	9.21	9.14	9.26
7	11.14	11.09	11.05	11.04	11.15	11.10	10.90	10.81	10.96
8	13.11	13.15	13.14	13.14	13.22	13.23	13.02	12.86	13.00
9	15.72	15.98	15.98	15.93	15.93	15.91	15.68	15.43	15.61
10	22.83	23.17	23.02	22.82	22.56	22.79	24.13	24.72	23.86
Bottom 20%	7.58	7.45	7.65	7.87	7.81	7.78	7.69	7.69	7.71
Bottom 40%	19.68	19.36	19.67	19.98	19.86	19.79	19.44	19.42	19.60
Bottom 50%	27.71	27.22	27.48	27.77	27.71	27.58	26.97	27.02	27.32
Top 40%	62.79	63.39	63.19	62.92	62.87	63.03	63.72	63.83	63.43
Top 20%	38.55	39.15	39.00	38.75	38.49	38.70	39.81	40.15	39.47
Gini	.316	.323	.319	.315	.314	.316	.328	.331	.324

Table 3.4A: Simulated Equivalent Disposable Income Distribution, Decile Shares: Years of Extremes

Decile	Peak	Low
1st	89-90	82-83
2nd	84-85	82-83
3rd	84-85	88-89
4th	81-82	87-88
5th	81-82	88-89
6th	81-82	88-89
7th	85-86	88-89
8th	86-87	88-89
9th	82-83/83-84	88-89
10th	88-89	85-86
Bottom 20%	84-85	82-83
Bottom 40%	84-85	82-83
Bottom 50%	84-85	87-88
Top 40%	88-89	81-82
Top 20%	88-89	85-86
Gini	88-89	85-86

Source: Table 3.4.

In consequence of this diverse pattern, analysis of changes in shares over time is very much dependent upon the base-year chosen. In examining trends over the 1980s, analytic logic would suggest the two extreme years. In the current case, these are 1981-82 and 1989-90. However, since the ABS conducted income surveys in each of these years, the data is readily available to researchers at least up to the disposable income concept should they wish to avail themselves of it, and are willing to accept the problems of comparability, particularly in respect of tax imputation (see Appendix Two). Such a choice would thus not fully illustrate the benefits that the microsimulation can provide.

Moreover, and of greater significance, as Figure 3.1 and Table 3.1 indicate, a substantial wave-like fluctuation in inequality and relative living standards occurred during the period. Indeed, it is purely by accident that the three actual surveys during the period did not occur at one of the peaks of 1982-83 and 1988-89, as a trend change revealed from such a survey to another point in the wave would have produced distorted results of the true trends in inequality. As it was, the 1981-82 survey occurred prior to the dramatic rise in 1982-83, although the 'current' income concept for September-December 1982 in part reflects the rise. The 1985-86 survey occurred at the bottom of the trough in the six-year wave. On the other hand, the 1989-90 survey occurred two years after the second peak and on a downward portion, if such a wave has continued after that point. In recognition of this, logic would suggest that two points at the same stage of the cycle would be the more appropriate choice. In that case the two peaks of 1982-83 and 1988-89 suggest themselves.

Against that, it seems disappointing not to use the latest data available, particularly as it can be related to an actual survey. Indeed, 1989-90 represents the latest year for which any income distribution survey or simulated data are available. Whilst conceptually there is no reason why the microsimulation cannot be re-run for a later period subject to exogenous data availability, resource and time constraints on this project unfortunately have not allowed that. It is one aspect of the research that we would hope others would pursue. Indeed, there is, conceptually, no reason why a Commonwealth Budget could not be taken, and by incorporating Treasury forecasts, the impact on the anticipated level of inequality of the Budget measures ascertained. Ultimately the hope would be that such policy impact evaluation may be incorporated ex ante, rather than ex post, into the policy formulation process. Against that, at this stage we feel that four to five years represents the maximum limits, given institutional arrangements, for the validity of the simulation to hold. It would thus be necessary to recalibrate the simulation based not on 1985-86 data but on the results of the 1989-90 survey.

If we feel obliged to take the latest year's data as a final reference point, then the case for taking a similar earlier point in the long-wave is compelling, and 1983-84 suggests itself from Figure 3.1. However, by a remarkable prescience Bradbury and Doyle (1992) using an earlier version of the microsimulation have conducted such an exercise for the cash-income concept. Our results for that period in this analysis do not substantially differ and support their conclusions in that paper.

Therefore, bearing in mind the social and political aspects of the distribution of income and living standard changes, we have decided, for the purposes of this Report, to take 1982-83 as the base year. It will be recalled that the Labor Government was elected in March of 1983 and thus had very little opportunity to affect that financial year's outcomes. So it can be taken generally as the base from which changes in living standards and inequality under the Labor Government can be examined.

The caveat to any interpretation of the results is that currently the analysis ceases at 1989-90. Much has occurred in the four years since that date: unemployment has increased dramatically; the economy has suffered several quarters of negative growth; inflation has fallen to very low levels; with increased take-up rates and extension, the benefits of the Family Package have begun to be realised; and there have been several changes to the social security and taxation systems as well as to social wage expenditure. Thus the conclusions derived should not be taken as conclusive of the entire period of the current government.

Taking 1982-83 as the base, Table 3.5 outlines the resultant changes in income share for each decile in both absolute and relative terms, for equivalent disposable income.

These results suggest that on a short run basis, the Labor Government presided over a period to 1989-90 where cash increases were concentrated in the bottom 30 per cent and the top 10 per cent. The remaining deciles 'lost' income share. With the exception of the ninth decile which may reflect a shift towards fringe benefits as remuneration, the biggest relative 'losers' were located in the fifth and sixth deciles.

The fifth decile, in relative terms, lost 2.0 per cent of its income share in 1989-90 compared to 1982-83. Conversely, the top (tenth) decile gained 0.69 in absolute terms and 3.1 per cent in relative terms. At the same time, the lowest decile (which received no private income) increased its share, through social security increases by 7.6 per cent, although this is of course from a much smaller base of an 1982-83 income share of 2.7 per cent, so the absolute rise is only 0.19 per cent.

Thus, we have the apparently paradoxical situation where, as indicated in the last five rows of Table 3.5 the bottom 20, 40 and even 50 per cent of income units gained in summed aggregate, as apparently could be stated did the top 20 and 40 per cent. The reason is this concentration of increase at the two extreme deciles, the first and the tenth. Clearly several different forces are at work to produce this outcome.

In Table 3.6, we attempt to isolate these forces by examining the absolute change in decile share by each component of disposable income: private income, the social security system and the taxation system. From this table it can be seen that, whilst the specific 'cause' of the change varies between each decile, the significance of changes in the taxation system in particular are again dominant amongst those deciles that actually pay significant income tax.

Table 3.5: Changes in Decile Shares of Equivalent Disposable Income: 1982-83 to 1989-90

Decile	Absolute Change (1989-90 share less 1982-83 share)	Relative Change (% of 1982-83 share)
1	+0.19	+7.6
2	+0.07	+1.3
3	+0.03	+0.5
4	-0.05	-0.8
5	-0.14	-2.0
6	-0.13	-1.4
7	-0.13	-1.3
8	-0.15	-1.2
9	-0.37	-2.5
10	+0.69	+3.1
Bottom 20%	+0.26	+3.5
Bottom 40%	+0.24	+1.2
Bottom 50%	+0.10	+0.4
Top 40%	+0.04	+0.1
Top 20%	+0.32	+0.8

Table 3.6: Absolute Changes in Decile Shares, Contributions of Components of Disposable Income, Percentages: 1982-83 to 1989-90

Decile	Private	Social Security	Taxation	Net Government (SS + T)	Total
1	.00	+.16	+.03	+.19	+.19
2	+.06	+.02	-.01	+.01	+.07
3	+.21	-.12	-.06	-.18	+.03
4	+.13	-.05	-.13	-.18	-.05
5	.00	-.01	-.13	-.14	-.14
6	+.02	-.03	-.12	-.15	-.13
7	-.10	.00	-.03	-.03	-.13
8	-.15	+.02	-.02	.00	-.15
9	-.22	-.01	-.14	-.15	-.37
10	+.07	-.01	+.61	+.62	+.69

For the lowest decile, who receive no private income, the increased overall share came about from increased (above average) social security payments. For the second decile, the dominant factor for those who experienced employment growth in part-time and casual work, was in the private income component. For elderly part-pensioners this could also reflect increased interest rates on savings. Whilst part of this was lost in increased taxation, the increases in social security benefits evident in the first decile still filtered through in part to this decile.

In the third and fourth deciles, there was clear and substantial growth in share from employment, probably in part-time or casual work, given the actual income levels involved. However, because of the interaction of this with the social security and taxation systems, these families gained in net only marginally in the third decile and actually lost in the fourth. For the third decile this occurred primarily through the social security system, possibly reflecting de facto 'poverty traps'. For the fourth decile, though, the decline was primarily attributable to changes in the taxation system. The impact of this is highlighted in the fifth and sixth deciles which experienced nil or negligible growth in private income but 'lost' significantly in terms of increased relative tax liabilities.

In the seventh to ninth deciles, income units experienced a decline in private income share. Whilst this may have been the result of slower than average nominal income growth from wages it may also reflect increased overt access to fringe benefits for managerial remuneration (see Raskall, forthcoming a). However, despite this decline in private income, changes in relative tax paid actually increased, resulting in the net outcomes noted in the total of Table 3.4 and in Table 3.5. Thus, in most deciles, it was changes in government social security or taxation redistribution measures that produced the declines in relative shares. The surprising exception was both the top and bottom deciles. In the tenth decile, despite an increased share of private income, probably through capital income increases over the period, the alterations to the tax system were such as to further increase their share by 0.61 per cent. Again, the inference is that this was due to the introduction of dividend imputation.

The net outcome of these private factor market and government policy changes was the pattern revealed in Table 3.6 with both the rich and the poor, that is the highest and lowest deciles gaining and the middle (deciles 5 and 6) losing.

The consistency of this result, or alternatively the sensitivity of the analysis to the base year chosen, is examined in Table 3.7 which details the relative percentage change in share at the disposable income level for each year to 1989-90. Thus, illustratively, if 1981-82 was taken as the base year, then compared to that year, the share of the first decile was 3.2 per cent greater in 1989-90. Conversely, the share of that lowest decile increased by 4.3 per cent from 1983-84 to 1989-90.

Looking firstly at the similarities, the conclusion reached earlier about the gains over the 1980s being concentrated in the lowest and highest decile holds, for every year up to 1987-88 compared to 1989-90. Whilst such growth continued for the first decile, from 1987-88 the share of the top decile began to fall, but not below the level for 1986-87. For virtually every other decile, such comparisons looking backwards from 1989-90 would indicate a decline in income share over the period. In the last two year period of the simulation, however, these middle-income deciles largely grew at the expense of the top decile. Indeed, the change between 1988-89 and 1989-90 is notable for the evenness by which each decile from the 3rd to the 9th gained a similar percentage share, as that in the 10th declined and the lowest two stabilised.

Table 3.7: Relative Changes in Decile Shares of Equivalent Disposable Income: 1981-82 to 1989-90

Year	81-82	82-83	83-84	84-85	85-86	86-87	87-88	88-89
Decile								
1	3.2	7.0	4.3	0.7	0.3	1.8	2.5	0.3
2	0.8	1.5	-1.2	-3.6	-2.2	-2.6	-1.0	0.2
3	-0.4	0.6	-1.3	-2.5	-1.4	-1.4	0.6	1.1
4	-3.2	-0.8	-0.9	-1.2	-1.2	-0.6	1.7	1.6
5	-3.9	-1.8	-1.2	-0.9	-1.7	-0.9	1.3	1.6
6	-2.5	-1.4	-0.8	-0.5	-1.7	-1.4	0.5	1.3
7	-1.6	1.2	0.8	0.7	1.7	1.3	0.6	1.4
8	-0.8	-1.1	-1.1	-1.1	-1.7	-1.7	-0.2	1.1
9	-0.7	-2.3	-2.3	-2.0	-2.0	-1.9	-0.5	1.2
10	4.5	3.0	3.7	4.6	5.8	4.6	-1.1	-3.5

Since 1989-90, unemployment has risen from 6.2 per cent to 10.4 per cent in 1991-92 and further to an upper level approximating 11.0 per cent. Based on the 1991-92 levels of unemployment, Saunders (1992b), using regression analysis, estimated that the impact on families (income units of two or more individuals) of the increase in unemployment was to increase inequality by transferring 2.6 percentage points from the income share of the bottom half to the top. Particularly affected were those families in the second and third family income deciles. The results for non-family individuals were not as clearly discernible. However, these 'family' income deciles are not the same as the income unit deciles we have used here, which include single person units.

To aid interpretation as far as to the location of particular family types in the overall equivalent income distribution, and thus the impact of such decile changes, Table 3.8 provides the 1989-90 family composition by equivalent disposable income decile. Thus, in the fifth decile, the major income unit type is couples with children (39 per cent) who together with childless working age couples form half the income units in the decile.

For the other deciles, those income units over-represented in comparison with their overall proportion of the population are:

1st decile:	young singles and sole parents
2nd	elderly, both single and couples
3rd	the elderly again with more middle-aged groups
4th	couples with children, and the elderly
5th - 7th	couples with children, and young singles with increasing presence of middle-aged single people
8th	young and middle-aged single people
9th and 10th	couples without children and middle-aged single people

Table 3.8: Composition of Overall Equivalent Disposable Income Deciles by Income Unit Type: 1989-90

	Decile										
Income Unit Type	1	2	3	4	5	6	7	8	9	10	All
Single											
<25	34	8	15	15	21	28	28	27	15	5	20
25-64	16	20	15	9	7	11	17	25	37	43	20
65+	6	32	26	15	10	4	3	2	2	3	10
Couples, no children											
<65	4	9	7	8	11	12	15	19	31	37	15
65+	4	20	17	16	8	5	3	2	2	3	8
Couples with children	18	7	17	33	39	37	31	23	13	8	23
Sole parents	19	4	3	3	4	4	3	2	1	1	4
Total	100	100	100	100	100	100	100	100	100	100	100

Thus, if we were to locate the second and third 'family' units in Saunders (1992b) terminology (that is excluding singles) we might expect them to be located in the third, fourth and fifth of all income units.

Whilst the specific percentages of income unit types in each equivalent decile will change over time in response to changes in between-group inequalities and demographic shifts, a comparison of changes from 1982-83 to 1989-90 in Table 3.9 does not suggest major parameter shifts, although a few points are worthy of comment. Demographically, the simulation indicates an increase in those aged over 65, associated with the 'ageing' of the population, part of which reflects the trend away from childbirth for couples. Beyond this, more than proportionate declines occurred in the first two deciles amongst both young single persons and sole parents in response to increased employment growth in this period, although this has since changed. The prevalence of only part-time opportunities for the young saw them move only into the third decile although half as many again were able to secure full-time work which put them up into the sixth equivalent disposable income decile. However, an equivalent number of low-paid full-time workers switched back to what is a part-time earners' decile three. On the other hand, the increasing number of divorced people as sole parents saw the movement out of the bottom quintile into the 4th-6th deciles. Conversely, there was a more than proportional relative movement out of the 5th, 7th and 9th deciles towards the 3rd and 4th reflecting increased participation in the labour force of married women in part-time and low-paid full-time jobs in this period.

Table 3.9: Changes in Composition of Equivalent Income Deciles by Income Unit Type: 1982-83 to 1989-90

	Decile										
Income Unit Type	1	2	3	4	5	6	7	8	9	10	All
Single											
<25	-2	-2	6	-2	-1	3	-1	1	0	-1	0
25-64	1	1	-1	0	0	2	4	2	3	0	1
65+	2	6	-5	1	1	0	1	0	0	1	1
Couples, no children											
<65	0	1	0	0	2	-3	0	0	2	0	0
65+	1	2	-1	0	2	0	1	-1	0	1	1
Couples with children	-2	-4	1	0	-5	-4	-5	-3	-5	-1	-3
Sole parents	-1	-3	0	1	1	2	0	0	0	1	0

The increased relative significance of single middle-aged (25-64) people in the 7th-9th deciles in particular possibly reflects their increased preference to defer marriage in the formal sense. In consequence, there was a noticeable shift towards a higher proportion of single as distinct from couples (on an equivalent income basis) in the upper wage earning deciles. Finally, in response to either movements in interest rates on investments or changes in pensions, the elderly tended to shift downwards from the third to the second deciles.

All of this reflects changes in relative living standards between income unit types, and it is to the utility of the microsimulation in examining these changes in more detail that Section 3.4 turns.

3.4 Simulation Results: Living Standards

Living standards depend not merely on the share of well-being (income) received, and changes thereto, but also on economic income size, and growth. To use the familiar analogy, it is not just the share of the cake that matters, it is the size as well. Such increases in real disposable income received by an individual or a group represent the additional capacity to participate in the market in terms of purchasing power.

Even if a particular share is falling, if real growth is sufficient it may counteract the decline attendant on the smaller share. Of course this reflects the question of absolutes and relatives, if the cake is growing then those groups whose share has increased relative to others will experience an even greater increase in absolute living standards. This raises the equity issue of the receipt of the benefits of economic growth, which may be as important as the equity in sharing of the burden

when the economy is shrinking. It is through the concept of living standards that the concepts of equity and efficiency meet.

Indeed, it has often been argued that increased inequality is necessary to achieve greater economic growth such that this increased growth compensates, in absolute increases in living standards, the relative losers in the 'slicing-up' process. That is, increased growth 'trickles down' to others. This argument is commonly applied to justify large inequalities in the distribution of income and wealth in developing countries on the basis that the average savings rate of the few high income recipients provides the aggregate savings that enable the necessary social and economic infrastructure investment to be financed. In theory, it is an empirical question as to whether high savings by a few produces an aggregate outcome for savings greater than small savings by many.

As the previous section indicated (Tables 3.5 and 3.7) irrespective of which period is taken up to 1989-90, those income units in the middle lost shares relative to the lowest income decile (or deciles in some years) and the highest (tenth) decile. Certainly, wage and price statistics (ABS, Cat. Nos 6410.0 and 6401.0) indicate that with the exception of the 1982 to 1985 period, real wages per employed person (real Average Weekly Earnings) declined in each year compared to the previous such that compared to 1982-83 real wages, on average, were 2.3 per cent lower in 1989-90, and 6.0 per cent lower than in 1984-85. The question is whether other private income changes, employment growth, social security and taxation changes provided cash income gains to families sufficient to counteract the decline in real average weekly wage earnings.

Short Run Changes

As indicated earlier, given not so much the lack of data from the income surveys but their infrequency, estimates of changes in living standards in either overall income units, or each type of defined income unit, is generally undertaken by comparing real income at one point with that at another. With the availability of annual data through microsimulation, the choice of base year is no longer constrained by survey dates.

If we again take the period from 1982-83 to 1989-90, the estimated percentage change in living standards, as measured by real disposable income is shown in Table 3.10. Nominal values were adjusted using the CPI (All Groups) (ABS, Cat. No. 6401.0). The data are presented for both the unadjusted income distribution and that equivalenced by the OECD scale. Also outlined are the changes in the mean averages for each income unit type.

The first point to note is that all deciles and all income units (on mean average) gained in real terms over the period. It is important to note that this is not longitudinal data so the same people/families are not necessarily in the same deciles at each point in time. Thus we are not saying that every family received a real

Table 3.10: Changes in Real Disposable Income by Decile and Income Unit Type: 1982-83 to 1989-90

Deciles	Unadjusted Overall	Equivalent
1	12.0	14.8
2	7.1	8.8
3	5.9	7.7
4	5.4	6.4
5	4.1	5.2
6	2.3	5.8
7	1.0	5.9
8	1.3	6.0
9	2.0	4.7
10	8.0	10.3
All - Mean	4.2	7.2
Income Unit Types		
Single <25	6.1	
Single 25-64	7.1	
Single 65+	9.5	
Couples, no children <65	5.9	
Couples, no children 65+	10.5	
Couples with children	6.2	
Sole parents	16.6	

increase in income. Clearly movements at an individual level occurred as some income units suffered a real decrease and others gained in excess of those determined by the mean values.

In respect of the decile share changes, the results for both distributions confirm the earlier analysis that the gains in the period were concentrated in the first, second and tenth deciles. On an adjusted income unit basis, the least gain was in the seventh decile. On the other hand, when income is adjusted by the equivalence scales, these lowest gains are in the fifth decile. This suggests that these 'losing' income units have more adults and/or children in them. This is confirmed by the changes in average real income by income unit type, which is on an unadjusted basis. Those with the largest gain were sole parents (16.6 per cent) and the elderly (either couples or single). Single people received a greater real gain than couples.

Within each of these income units significant variations occurred as indicated by Table 3.11, which shows the real gain in percentage terms for each decile of each income unit type. Aside from the gains to sole parents as a result of both increased benefits and increased employment, the other notable feature is the consistent gains of the top decile for each income unit type. With the exception of young singles, the gain in the tenth decile is the largest of each decile for all groups. The only decile groups that match the increases of the top decile are the first and second decile of young singles and the bottom decile of middle-aged singles and couples with children, reflecting social security increases.

Table 3.11: Changes in Real Disposable Income by Decile of Income Unit Type: 1982-83 to 1989-90

	Decile										
Income Unit Type	1	2	3	4	5	6	7	8	9	10	Mean
Single											
<25	12.8	14.9	10.1	6.6	6.5	5.8	6.0	5.3	4.5	4.4	6.1
25-64	13.8	8.2	10.7	10.6	5.5	4.0	3.5	1.4	3.1	15.3	7.1
65+	7.6	6.1	6.2	5.9	7.0	7.9	8.6	8.6	10.1	14.9	9.5
Couples, no children											
<65	7.0	6.7	3.6	5.9	6.5	6.3	3.8	3.3	2.5	11.0	5.9
65+	6.2	5.9	6.0	7.1	8.3	8.6	9.5	8.5	8.9	18.6	10.5
Couples with children	12.3	7.0	3.9	3.1	2.9	2.3	2.5	2.6	2.2	17.7	6.2
Sole parents	31.5	22.3	20.8	18.4	16.7	23.0	23.1	22.4	10.6	7.8	16.6
All (unadjusted)	12.0	7.1	5.9	5.4	4.1	2.3	1.0	1.3	2.0	8.0	4.2

Distribution of Change in Living Standards

Much of the above, of course, can be gleaned from the earlier decile share analysis since, as the alert reader will have gleaned from Table 3.10, the percentage gains in each decile when the mean increase is subtracted equate to the decile share changes in Table 3.5. However, what might be of greater interest is the examination of the distribution of the change in living standards. That is, who gained the greatest proportion of the gain/burden of change in any period?

Table 3.12 details this distribution for the comparison of 1989-90 and 1982-83. That is, it outlines that proportion of the 7 per cent increase in overall real equivalent gains apparent in the period that each decile group received. Comparing the mean real disposable income by each decile in 1989-90 to that in 1982-83 indicates, in the final column, that of the total real gain of 7.2 per cent, the first decile received 5.6 per cent. In fact, each of the first five deciles received a share of the growth which varied very narrowly from 5.6 to 5.8 per cent. Given that the original 1982-83 share of the first decile (2.70 per cent) was less than that of the fifth (7.86 per cent), its share increased at a greater rate as reflected in Table 3.10. It is noticeable that the top decile received an apparent increase over the period such that it obtained just over one-third of the total gain. This was in excess of its original 1982-83 share and thus its share increased. In fact, 54.7 per cent of the real income growth went to the top three deciles.

However, Figure 3.1 indicates that the fluctuation of inequality in the period under analysis is such that a comparison (implicitly assuming a consistent trend) can hide

Table 3.12: Distribution of Change in Real Disposable Income by Decile: 1982-83 to 1986-87, 1986-87 to 1989-90 and 1982-83 to 1989-90

Decile	1982-83 to 1986-87 (a)	1982-83 to 1986-87 (b)	1986-87 to 1989-90	1982-83 to 1989-90
1	29.0	18.3	3.8	5.6
2	43.2	27.2	3.0	5.8
3	26.5	16.7	4.2	5.8
4	5.3	3.3	5.8	5.8
5	-5.6		6.6	5.7
6	10.0	6.3	7.4	7.5
7	14.1	8.9	8.8	9.2
8	29.3	18.4	9.5	10.9
9	1.3	0.8	11.0	10.3
10	-53.1		40.0	33.5
Total	100.0	100.0	100.0	100.0
Mean Gain	0.5		6.6	7.2

Notes: (a) Including both gains and losses.
(b) Includes only gain, that is, only those deciles that made a gain and excluding deciles 5 and 10 that made a loss in (a).

much. This is highlighted by the other two columns in Table 3.12 which separates the 1982-83 to 1989-90 period into two sub-periods, one from 1982-83 to 1986-87 and the other from 1986-87 to 1989-90. The calculation of the decile share of the change is replicated in each sub-period. As Table 3.12 indicates, some significant differences appear.

In the earlier sub-period, 1982-83 to 1986-87, two deciles, the fifth and the tenth, in fact suffered a decline in real living standards. Whilst the mean real gain was only 0.5 per cent in that sub-period these two deciles declined by an amount equivalent to 5.6 per cent and 53.1 per cent of the apparent gain, as column (a) shows. In column (b) only those deciles which obtained a gain are recorded as a percentage of the total 'gainers' income growth.

What becomes apparent is that in this sub-period most of the gains went to the lower end of the distribution, and the second decile in particular. The other major 'gainer' decile was the eighth. On the other hand, the middle deciles, the fourth to the sixth, and the top two deciles either declined or had minor shares of the gain. In consequence, inequality fell in this sub-period as indicated by Figure 3.1.

In comparison, in the other sub-period, a significantly different pattern emerges in the distribution of the 6.6 per cent overall real growth. Between 1986-87 and 1989-90, the second decile, far from receiving most of the gain, as in the earlier sub-period, in fact received the least, only 3 per cent of the overall growth. On the other

hand, the tenth decile, far from losing its share, gained a massive 40 per cent of the total real income growth. In this sub-period, the top three deciles received over 60 per cent of the gain and the top quintile over half.

The point is that with annual data on income distribution, the pattern of change becomes far more complex such that trends over a period do not reveal a true or consistent pattern of change during that period.

Cumulative Changes

These comparisons, moreover, do not of themselves indicate how living standards have changed **during** a particular period. For instance, it may be the case that the needs of a specific group were ignored for much of a period and then in response a policy initiative was introduced which immediately raised standards above an earlier benchmark. Annual changes would suggest an increase in living standards when in fact for the majority of the period of investigation, living standards declined.

The availability of annual data enables the calculation of the **cumulative** gain or loss over a period for all or any income unit type. The gain or loss each year relative to a benchmark base year can be averaged over the whole period, to provide a more informative analysis of living standard change **during** a **period.**

Again with 1982-83 as the base year, Table 3.13 shows these changes on a cumulative basis, that is, the sum of the annual real changes over the period, divided by the original 1982-83 base. As may be expected, the gains averaged **during** the period are less than the gains determined by point to point comparison of the end to the beginning, unless that gain occurred in the first year of the period (1983-84) and was maintained every year over the period. The gains to the bottom three deciles (particularly dependent on social security) accrued earliest in this period. That is, the Labor Government directed its redistributive priority initially to this group. On the other hand, the gains to the fifth decile (amongst the lowest on a point to point basis) were also in comparative terms the last to be provided. Thus on a 'truer' cumulative basis, over the 1982-83 and 1989-90 period the living standard gain of this decile was least.

Similarly, the gains to couples with and without children and sole parents are also reduced considerably. Couples with children in fact suffered a cumulative loss up until 1986-87; for those without children this occurred up until 1984-85. The principal reason for this was probably the decline in married women participation rate in the period up to 1985-86 as revealed in the labour force statistics (ABS, Cat. No. 6224.0). In respect of the 'true' gains, on a comparative basis, of couples with children it is little wonder the government felt the need to introduce the Family Package.

On the other hand, the gain in the top decile came principally in last three years of the decade, largely in response to changes in the tax treatment of dividend income, commencing in the 1987-88 income year.

Table 3.13: Cumulative Changes in Real Disposable Income by Decile and Income Unit Type: 1982-83 to 1989-90

Deciles	Equivalent Income
1	9.2
2	6.4
3	4.5
4	2.6
5	1.7
6	2.3
7	2.5
8	2.8
9	2.0
10	5.2
All-Mean	3.5
Income Unit Types	
Single <25	3.7
Single 25-64	3.6
Single 65+	5.3
Couples, no children <65	2.1
Couples, no children +65	5.6
Couples with children	1.6
Sole parents	7.8

The Impact of the 1982-83 Recession

Whilst space does not allow for a fuller examination either of cumulative gains during parts of the period or annual analysis of the change in living standards by equivalent decile or income unit types, it is worthwhile to consider the pattern of changes attendant on the recession in 1982-83.

As we have noted the simulation data and indeed all survey data released by the ABS ceased in 1989-90, the last year for which we have information. Yet since that time, unemployment has risen dramatically from 6.2 per cent to, at times, 11 per cent. The 1989-90 to 1993-94 period is clearly a different period to that we can analyse from current data. Whilst Saunders (1992b) has estimated a significant impact on inequality since 1989-90 consequent upon this unemployment growth, it is only an estimate based upon regression analysis of past data, with very few data points.

However, the annual data (albeit simulated) covers the last 'major' recession in 1982-83. From June 1982 to June 1983, the total number unemployed increased by 241600 or by 53.5 per cent (dXEconData). In consequence, the unemployment rate rose from 6.6 per cent in June 1982 to 10.0 per cent in June 1983, before falling to 8.9 per cent in June 1984. Moreover, the numbers employed decreased by 183800 from June 1982 to June 1983 (dXEconData) before increasing by 170700 by June 1984. The number of families with no employed members increased by 72500

between June 1982 and July 1983 (ABS, Cat. No. 6224.0). The simulation incorporates both these labour market changes as well as any consequential impacts on average wages and other income sources.

Thus, the results observed from the simulation provide some indication of the distributional impact of that recession and, by inference, the likely impact of the current recession. Table 3.14 presents equivalent income decile share changes from 1981-82 to 1982-83 for both the private and disposable income concepts.

As indicated by Figure 3.1 and Table 3.14, inequality rose dramatically at the private income level with the Gini coefficient rising by 3.7 per cent from .487 to .505. Moreover, the increased inequality is unambiguous, with the lowest deciles losing substantially and the highest deciles gaining. The private income shares of the second and third deciles fell by 31.6 and 25.0 per cent respectively.

As indicated earlier, the government cash-transfer system, and in particular the social security system acted to mitigate this private income change at the disposable income level. However, inequality still increased substantially with the shares of the fourth, fifth and sixth deciles being particularly affected. Pressures placed upon the social security system, and possibly an incapacity to cope with the nature of the unemployment change in terms of eligibility conditions, saw the share of the lowest decile at the disposable income level fall by the largest relative percentage, 3.6 per cent. Whilst it would be incorrect to attribute all of this change to increased unemployment there can be little doubt that this rise in unemployment was the major economic factor giving rise to the observed change.

These comments are reinforced when the gross income distribution is considered in Table 3.15. The impact, though less than the private income changes, is borne primarily at the fourth and fifth deciles.

Beyond these income share changes, though, real income per income unit fell in the year by 4.4 per cent at the private income level, 3.1 per cent at gross level and 2.0 per cent at the disposable income level. In Table 3.16 the distributional burden of the resultant change in living standards by decile of equivalent income is presented for each income concept (analogous to Table 3.15). In this table, if the burden were shared equally 'across the board', each decile would have suffered 10 per cent of the overall decline. Thus, the extent to which one decile is greater than 10 per cent indicates a disproportionate share of the burden in relation to its population share.

At the private income level most of the overall decline in real living standards was borne in the fourth decile (21.1 per cent) with lesser cuts of 14.7 per cent and 13.2 per cent of the overall total in the fifth and six deciles. With the operation of the social security system, not only was the overall cut reduced from 4.4 per cent to 1.2 per cent but as the middle column of Table 3.16 indicates at the gross income level, it was spread more evenly across the deciles. In six of the deciles, the share of the decile was within 12-14 per cent of the total decline. The bottom three deciles, reliant upon the social security system, were more protected from the burden of overall decline in real living standards.

Table 3.14: Absolute and Relative Changes in Decile Shares of Private and Disposable Equivalent Income: 1981-82 and 1982-83

	Private				Disposable			
Decile	1981 -82	1982 -83	Change Absolute	Relative (%)	1981 -82	1982 -83	Change Absolute	Relative (%)
1	0	0	0	0	2.80	2.70	-0.10	-3.6
2	0.19	0.13	-0.06	-31.6	4.78	4.75	-0.03	-0.6
3	1.72	1.29	-0.43	-25.0	5.48	5.43	-0.05	-0.9
4	5.42	4.70	-0.72	-13.3	6.62	6.48	-0.14	-2.1
5	7.93	7.63	-0.30	-3.8	8.03	7.86	-0.17	-2.1
6	10.04	9.89	-0.15	-1.5	9.50	9.39	-0.11	-1.2
7	12.30	12.33	+0.03	+0.2	11.14	11.09	-0.05	-0.4
8	14.87	15.09	+0.22	+1.5	13.11	13.15	+0.04	+0.3
9	18.30	18.81	+0.51	+2.8	15.72	15.98	+0.26	+1.7
10	29.23	30.13	+0.90	+3.1	22.83	23.17	+0.34	+1.5
Gini	.487	.505	+.018	+3.7	.316	.323	.007	+2.2

Table 3.15: Absolute and Relative Changes in Decile Shares of Gross Equivalent Income: 1981-82 and 1982-83

	Gross		Change	
Decile	1981-82	1982-83	Absolute	Relative %
1	2.28	2.22	-0.06	-2.6
2	3.89	3.91	+0.02	+0.5
3	4.54	4.52	-0.02	-0.4
4	5.87	5.65	-0.22	-3.7
5	7.51	7.30	-0.21	-2.8
6	9.18	9.03	-0.15	-1.6
7	11.08	11.00	-0.08	-0.7
8	13.31	13.34	+0.03	+0.2
9	16.31	16.56	+0.25	+1.5
10	26.02	26.46	+0.44	+1.7
Gini	.370	.376	+0.006	+1.6

Changes to living standards contingent upon the taxation system are indicated by the disposable income column. There, in a change from the more equalising two-tier impact at the gross level, the burden of decline came more to resemble a 'normal' curve. The largest share of the overall decline was borne in the fifth (16.1 per cent) and sixth (14.9 per cent) deciles with this percentage share falling off as we move 'down' the deciles to lower-income families and 'up' to the highest earning income units.

Across all measures it seemed to be the ninth decile, on equivalent income terms, which was least affected in terms of bearing the burden of restraint through its share of the overall reduction in living standards.

Table 3.16: Distribution of Changes in Income Distributions by Decile: 1982-83

Decile	Private[a]	Gross[a]	Disposable[a]
1	0	-4.4	-7.9
2	-1.5	-3.1	-5.9
3	-11.1	-5.4	-8.6
4	-21.1	-12.8	-13.3
5	-14.7	-14.2	-16.1
6	-13.2	-13.7	-14.9
7	-11.6	-13.5	-13.8
8	-10.1	-12.3	-11.0
9	-7.1	-8.6	-2.6
10	-9.6	-12.1	-5.9
Total	100.0	100.0	100.0
Change in Real Income	-4.4	-1.2	-2.0

Note: (a) Re-ranking occurs for each income type.

When the actual changes in real disposable income between 1981-82 and 1982-83 are examined by income unit type, it is apparent from Table 3.17 that the cuts occurred across all types with the exception of the two groups of the elderly (single and couples) who were able to increase their unadjusted real disposable income, across all deciles.

The burden, on average, was most felt by young (under 25 years) single person income units, where real disposable income fell by 3.5 per cent. However, this average was not substantially greater than for each of the other income unit types to suffer a decline. However, examination of the extent of change (largely decline) for each **decile** by income unit type in Table 3.17 reveals an interesting pattern.

For the young singles all the bottom six deciles suffered a percentage decline in excess of the overall average, whilst the top (tenth) decile in fact gained. Particularly hit in terms of change in living standards were the second and third deciles of this income unit type.

For middle-aged singles (25-64), despite an overall mean decline this was concentrated again in the bottom six deciles with the top four deciles gaining in real terms. Particularly hit here was the fourth decile which suffered a 7.3 per cent cut.

As we have already indicated the elderly were least affected by the recession and in both groups relating to people over 65 not only was there an overall increase but each decile reflected this increase.

For couples, whether with children or childless, on the other hand, the reduction in employment opportunities was felt in living standard declines in each decile of both

Table 3.17: Distribution of Changes in Real Disposable Income Distributions by Income Unit Type, Percentages: 1981-82 and 1982-83

	Income Unit Type							
	Single			Couples			Sole parents	All (Unadjusted)
				No children		With children		
Decile	<25	25-64	65+	<65	65+			
1	-7.9	-1.4	+2.1	-1.7	+1.1	-10.8	-0.1	-3.9
2	-8.8	-0.6	+1.8	-6.5	+0.2	-6.4	-1.0	-3.0
3	-10.9	-3.6	+1.0	-5.3	+0.1	-3.3	-2.7	-4.6
4	-7.7	-7.3	+0.6	-3.8	+0.5	-2.1	-2.6	-4.1
5	-6.5	-3.4	+0.9	-2.6	+0.7	-1.6	-2.0	-4.9
6	-3.6	-1.8	+1.3	-2.2	+1.2	-1.7	-3.2	-3.7
7	-2.7	+0.1	+1.6	-1.4	+1.3	-1.4	-5.8	-2.6
8	-2.4	+1.3	+2.3	-0.9	+1.0	-1.2	-7.0	-2.2
9	-1.3	+0.9	+1.6	-0.6	+1.4	-0.9	-3.0	-1.9
10	+0.9	+0.1	+1.8	-1.5	+0.7	-1.9	-0.5	-1.8
Mean	-3.5	-1.0	+1.5	-2.1	+0.9	-2.4	-2.9	-2.7

groups. For a childless couple the maximum impact was in the second and third deciles, whereas for couples with children this was further down in the first and second deciles. In fact, the bottom decile of couples with children suffered a 10.8 per cent decline in real living standards, a cut matched only by the third decile of young singles.

For sole parents, though, the impact of decline was not so much borne by the lowest deciles, although again all did suffer a decline, but particularly by sole parents in the seventh and eighth deciles.

The net outcome of all these differential changes in living standards between income units and disparate declines across different deciles within each income unit type is reflected in the overall change by decile in the final column. This, it will be recalled, reflects the unadjusted distribution as distinct from the equivalent income distribution we have examined in earlier tables in this section. The results, however, are not dissimilar. Again, the cuts in real living standards were borne by the lowest six deciles with the declines in the third, fourth and fifth being the largest.

In summary, then, utilisation of the microsimulation to examine the annual change in real living standards, on a cash-money basis, in consequence of the recession between 1981-82 and 1982-83, reveals that:

- the burden, after both the operation of the social security and the tax system, was most heavily centred on the fourth and fifth deciles on an equivalent income basis and the third to fifth on an unadjusted income unit distribution;

- with the exception of the elderly, in general, all income units across all deciles incurred a loss in living standard;
- however, the top four deciles of middle-aged single person income units and the highest-earning young singles ahieved a real gain in living standards;
- the burden of reduced employment opportunities was in general greatest on young (under 25) single persons, and couples;
- those couples in the lowest three deciles tended to bear far greater than average cuts in living standards;
- the impact on independent single person income units was more diverse, with both a larger number of losers but also gainers; and
- in contrast, the impact on families was more consistent, in the form of a cut in all deciles, the greatest cuts being located in the lowest four deciles.

These results are in general consistent with the results Saunders (1992b) obtained through a time-series regression of the results of the six released and published ABS surveys over the 1968-69 to 1989-90 period though his main concern was with families and non-family individuals.

Both sets of results would therefore suggest that the burden of recession would have very specific impacts dependent upon both relative income levels (location in the decile distribution) and family type.

The analysis in this section could of course be replicated for each year to examine specific movements within and between income unit types and overall. Whilst space does not permit us to do so in this paper, the value of the microsimulation technique in enabling closer examination of the impact of particular economic phenomena can be readily demonstrated.

3.5 Summary

Without reiterating the myriad of conclusions that the operation of the microsimulation enabled us to examine in this chapter, it is, however, worthwhile to summarise the main points.

Firstly, following traditional cash-only measures of income as used by ABS studies and others and examining consequent revealed inequality and living standard changes both within and between income unit types and overall, several conclusions became apparent on an annual basis, using an equivalent disposable income concept:

- the dramatic increase in inequality between 1981-82 and 1982-83, contingent upon the economic recession in that period;

- the wave-like pattern of economic inequality apparent after all cash-transfer elements of government redistribution;
- the peaks of inequality occurring in 1982-83 and again in 1988-89, with a trough indicating lowest inequality in 1985-86;
- the impact of social security changes in mitigating the extent of fluctuations in private inequality;
- the converse impact of the taxation system in exacerbating changes in inequality;
- in particular, the impact of the taxation system in giving rise to significant increase in inequality in the late 1980s, largely related to the introduction of dividend imputation; and
- the differential impact of aggregate movements on different income unit types.

In illustratively looking at changes in living standards year by year from 1982-83 to 1989-90, we were able to ascertain that whilst living standards (as measured by real disposable income) increased, the rate of change varied both between deciles on an equivalent income basis and between income unit types. However, utilising the benefits of annual simulations, the cumulative change **over** the period could be determined to better reflect the real change in living standards during that period. This showed that the greatest gains in real cash-money income accrued to the bottom three deciles, and in particular the first decile, and to the top (tenth) decile. On the other hand, the gains were least to those income units in the fifth and sixth deciles. Amongst income unit types the major gainers were the elderly and sole parents, whereas the relative losers were couples, particularly those with children.

Finally, to illustrate the way in which the simulation can be used to examine change over a particular year, and in view of its possible relevance to the current recession, this chapter also examined the impact of the 1982-83 recession in terms both of inequality and the 'burden' of declines in living standards. The results obtained from this analysis indicated that the burden at disposable income level was most heavily concentrated in the fourth and fifth deciles on an equivalent income basis and that it was particularly greatest on young (under 25) single persons and couples (especially those in the lowest deciles). The result amongst all single person income units was far more diverse with several deciles in fact gaining in real living standards, whereas amongst couples a more uniform decline was evident with the exception of the elderly.

However, in noting such results, several issues arose which demanded our attention. These relate not merely to these conclusions but to the underlying microsimulation methodology and its limitations as well as the potential for further research on such cash-based estimates of inequality and living standards. Notable amongst these was the apparent significance of the introduction of dividend imputation in generating increased inequality from 1987-88 onwards. In addition, because of the apparent

inability of the microsimulation to adequately reflect changes **within** factor markets and relative inequality changes, the impact of incorporating such changes particularly for the development of stand-alone estimates of annual inequality needs to be examined.

Over-riding all of these, however, is the question of how valid such conventional cash-income estimates of inequality and living standards are, in considering true levels of 'well-being', and particularly, having incorporated personal taxation, what effect and changes to these conclusions above occur in consequence of considering the social wage expenditure of that taxation. It is to these sensitivity analyses and definitional extensions that we now turn.

4 Issues Arising From Simulation Analysis

As was indicated in the previous section, the application of the microsimulation technique raised a number of issues which are deserving of further examination without interrupting the focus of analysis of that section. In a sense they are all illustrative of the ways in which the microsimulation technique (and the results obtained) can be used, the methodological and operational issues highlighted, and its deficiencies addressed in order to maximise the potential that the technique provides researchers in analysing and interpreting inequality and living standard changes.

Principal amongst these was the apparent sharp increase in inequality, both as measured by the summary Gini coefficient and the decile shares of disposable income in the latter part of the 1980s, consequent upon the introduction of dividend imputation. By making use of the modelling basis of the results presented we can examine the specific impact of this measure and the counterfactual results that may have been obtained if it had not been introduced. More importantly, consideration of this issue raises significant methodological issues for microsimulation analysis regarding the capacity to incorporate a major shift in the total tax system in which apparently diverse elements become more integrated. As has been already indicated, we have certain concerns as to how the ABS has resolved these issues in its personal income tax imputation in the 1989-90 Income Distribution unit record tape.

The second issue we deal with reflects the model's current inability to incorporate within-group changes to the distribution of both capital and labour factor income. The microsimulation as outlined in Section 2 incorporates a wide variety of factors that might impinge upon the levels of inequality and living standards such as changes in the level of wages by gender and employment status, changes in the level and nature of employment and unemployment, and changes in the level of other factor incomes such dividends, interest and rents. However, as Appendix Two indicates, particularly for the 1981-82 to 1985-86 period in which great change occurred attendant upon the impact of the 1982-83 recession, the model did not adequately incorporate changes in distribution within, for instance, dividend income or within the full-time labour market, which manifested themselves with increased inequality as evidenced from external sources such as wage statistics. The result is that the private income inequality module for that earlier period does not fully reflect the actuality of the change. To redress this deficiency we are able to use a quasi-simulation to develop a more accurate series of inequality measures suitable for use in other avenues of research that the technique opens up.

Illustrative of such research is the analytical development of the links between revealed economic inequality and attendant social phenomenon. In this chapter we explore these issues.

4.1 Dividend Imputation

Dividend imputation was introduced to remove the so-called double taxation of dividend income, firstly in the form of company tax on company profits then in the hands of the dividend recipient. On a comparative basis, virtually all dividend income became non-taxable in the hands of these recipients. Analysis of the 1989-90 Income Survey unit record tape shows that these people are heavily concentrated in the top decile. The trade-off was an initial increase in the company tax rate, although this too was subsequently lowered. Paradoxically, the lowering of the company tax rate, post-imputation, meant that a greater proportion of received dividend income became taxable within the personal tax system. This is partly reflected in the increased progressivity of the tax system in 1989-90, as measured by the increase in the difference between Gross and Disposable incomes.

Examination of the *Taxation Statistics* over this period reveals the extent of the gain to the very high income earners. The Commissioner of Taxation publishes annually a table which shows the income source and tax paid by those declaring a taxable income of over $500,000. Table 4.1 shows for the period 1986-76 to 1989-90, the numbers of such individuals, their total taxable income, the amount of dividend income and the amount of tax paid both in total and on average. Dividend imputation applied from the 1987-88 tax year. However, it should also be recognised that the taxable income data includes the value of dividend imputation credits received.

Table 4.1 speaks for itself. There was a massive increase in the absolute value of dividend income, particularly in 1988-89, and in its relative value compared to total income and a corresponding massive decrease in average tax paid. Compared to 1985-86 and 1986-87, dividend imputation reduced average personal income tax paid in 1988-89 by about $350,000 per taxpayer as revealed in the last column, about the average amount of dividend income received.

Whatever the merits as far as horizontal equity was concerned in introducing dividend imputation, the impact on vertical equity or redistribution by income level was extremely significant, given the distribution of share ownership.

It is not valid to claim that the effective rate of tax including the value of imputation credits was maintained at the top marginal rate (or thereabouts) because prior to its introduction this 'effective' rate of tax was in fact much higher. It is little wonder then that both the 1988-89 and 1989-90 Budget Papers explain the shortfall in actual revenue received in the previous year relative to forecast revenue on the basis that the revenue impact of dividend imputation was 'underestimated'.

One of the benefits of the microsimulation approach is that we are able to indicate the impact of particular measures by conducting alternate runs of the model including or excluding certain factors. Bradbury and Doyle (1992) term these 'counterfactual' simulations, which they use to indicate the impact of economic and employment growth in 1989-90 compared to 1983-84. The outcomes of these

Table 4.1: Impact of Dividend Imputation on Taxpayers with Taxable Income Exceeding $500,000: 1985-86 to 1989-90

Year	Number of Taxpayers	Total Taxable Income $m	Dividend Income $m	Net Tax Paid $m	Average Tax Paid ($'000)
1985-86	269	238.1	11.4	136.4	507.2
1986-87	290	255.5	15.3	142.9	492.8
1987-88	1009	1047.6	163.3	309.5	306.7
1988-89	3053	3368.0	834.0	451.0	147.7
1989-90	1274	1209.0	184.0	410.0	321.8

Source: *Taxation Statistics*, various years.

counterfactual simulations represent outcomes which would have been observed if policy or economic changes had been different from those which actually took place. By comparing observable or other estimated outcomes with these counterfactuals it is possible to estimate the impact of such changes. As in previous sections of the paper, all tables and data refer to the non-self-employed population.

In Table 4.2, the outcomes, in terms of equivalent disposable income Gini coefficients, of running the simulation excluding dividend imputation are presented, that is, as if dividend were continued to be taxed as other income in an individual's hands and not subject to an imputation credit, for company tax paid at the corporation level. The change from the 'observed', or in this case 'simulated', outcome including dividend imputation is also outlined.

Thus, the effect of dividend imputation in 1987-88, its first year of introduction, was to reduce the inequality at the disposable income level (and hence the progressivity of the tax system) by .004. That is, if dividends had been taxed and treated as income in an individual's hands, the outcome would have been a decline in disposable income inequality (by .004), an increase in tax revenue and a system which was 7.7 per cent more progressive overall.

In 1988-89, with both a surge in dividend income and an increased proportion of 'franked' dividends (from 73 per cent to 92 per cent, as indicated by the *Taxation Statistics*, Commissioner of Taxation), the impact of inequality is indicated by a disposable income Gini coefficient .006 (or 1.9 per cent) more than would have applied if dividend imputation was not pursued. This involved a revenue loss of $1730m over all income units, and a reduction in progressivity of the tax system of 12.2 per cent.

In 1989-90, the value of the imputation credit was reduced, with the decline in the company tax rate from 49 per cent (equal to the top marginal tax rate) to 39 per cent. This effectively, meant that for those in the top tax rate bracket, franked dividend

Table 4.2: Impact of Dividend Imputation on Equivalent Income Distributions, Gini Coefficients: 1987-88 to 1989-90

	With	Without	Difference	% Tax (Without)
1987-88				
Private	.508	.508		
Gross (G)	.375	.375		
Disposable (D)	.327	.323	-.004	
Tax (G-D)	.048	.052	+.004	7.7
1988-89				
Private	.502	.502		
Gross (G)	.373	.373		
Disposable (D)	.330	.324	-.006	
Tax (G-D)	.043	.049	+.006	12.2
1989-90				
Private	.501	.501		
Gross (G)	.372	.372		
Disposable (D)	.324	.319	-.005	
Tax (G-D)	.048	.053	+.005	9.4

income was subject to a tax rate of 20 per cent rather than tax-free. In consequence, the impact of dividend imputation on inequality through the tax system was reduced. Even so, the apparent progressivity of the personal income tax system was some 9.4 per cent below what it would otherwise have been if dividend imputation credits were not available. The revenue loss estimate of the simulation (for all income units) in 1989-90 was $2059m.

As indicated in detail at the conclusion of Appendix Two, we have some concerns regarding the validity of the taxation imputation of ABS attached to the 'final' unit record tape for 1989-90 particularly in respect of the apparent treatment of dividend imputation credits, in determining actual tax paid and disposable income. Irrespective of these, dividend imputation raises the issue of how researchers should treat a major change to the entire tax system, which incorporates changes in the personal tax system for microsimulation work incorporating personal tax imputation which aims to compare inequality over time.

Prior to the introduction of dividend imputation under the so-called 'classical' system, company taxation and personal income taxation were conceptually separate. Income received by individuals in the form of dividends was treated as income from any other source and treated for social security and taxation purposes similarly. Broader tax incidence studies, such as Warren (1992), which sought to examine the overall incidence of the entire tax system, were able to allocate the burden of company taxation between shareholders and consumers (akin to indirect taxation) by making assumptions about the relative burden. Generally, as in Warren (1992), a preferred 50:50 split was made.

However, with the introduction of dividend imputation these two systems were fully integrated. Shareholders (dividend income recipients) receive a credit (akin to a tax rebate) on dividends upon which company tax has been paid at the full company tax rate (called franked dividends). The implicit incidence assumption is that shareholders bear the entire (100 per cent) incidence of company tax. Thus, if we were to be totally consistent (and accepting this assumption in fact) to ascertain trends over time in both tax paid, its incidence and in consequence the distribution of disposable income, then company tax payable at any previous comparative point in time should also be incorporated in a personal income tax simulation, and allocated to dividend recipients. Changes in that corporate tax rate would then be reflected in effective personal tax rate changes. This connection is highlighted by the fact that the company tax rate in Australia was intentionally increased as a revenue 'trade off' for the introduction of dividend imputation in 1987-88, although it was subsequently reduced again. Thus the impact of the introduction of rebated dividend income can now be treated for what it actually means to individual shareholders, within the context of the total legal tax burden faced by shareholders.

As it stands, the microsimulation treats such franked dividends as if they were effectively tax-free (or, indeed, as if they provide a tax benefit in excess dividend income for those on a personal marginal tax rate below the company tax rate). The implicit assumption is that the actual incidence, as distinct from the legal liability, for company tax on profits is borne totally by consumers and not by shareholders. Alternatively, in effective operational terms, it is assumed that in the period under investigation the amount and burden of corporate tax was unchanged relative to personal tax. Thus, even if borne by shareholders it made no impact in analysing the effect of changes in the personal tax system.

The position is further complicated by the treatment of such imputation credits as 'income' for taxable income and social security eligibility purposes. The credit, which is not in a cash form, over and above the cash money dividends paid, is treated by the Commissioner of Taxation as assessable for income tax purposes, and indeed for determination of the Medicare levy, and total tax liability is determined following its inclusion. After this tax liability has been assessed, the imputation credit is then deducted as a rebate to determine actual tax payable. The credit is effectively treated as a pre-payment of income tax. On the other hand, the Social Security system, to date, does not consider such 'quasi-money' imputation credits as part of income used in the purposes of establishing eligibility for social security pensions and benefits. Aside from complicating the microsimulation programming, the conceptual question is raised as to whether it should be incorporated in 'gross income' for the purposes of comparative inequality research and, if so, should this be extended back over time even before the imputation system was introduced?

The operational treatment of the imputation credit is even more complicated by its treatment in the *Taxation Statistics* by the Commissioner for Taxation. In response to adverse publicity regarding the apparent tax paid by high income recipients as revealed in Table 4.1, the Commissioner introduced an additional line into the

statistics presented to indicate the 'effective' tax rate paid by adding all rebates including the imputation credit back into 'tax paid' in the **individual** tax statistics.

In the simulation to date, the imputation credit (with its effect on personal tax paid on dividends) has been incorporated by adding it in for determining personal tax assessable and then subtracting it to determine actual personal tax payable. This has the effect of substantially making dividends (or the proportion that is franked) tax-free, at least for 1987-88 and 1988-89 where the company tax rate of 49 per cent equated with the top marginal tax rate applicable to most dividend recipients. The implicit assumption is made that the burden is borne entirely by consumers, in the form of higher prices, as noted above. Thus the concern is with actual not legal liability. It should also be noted that this is implicitly the procedure adopted in earlier imputations from the 1981-82 survey and, of course, in terms of actual tax paid in the 1985-86 where data on company tax paid on dividends received was neither incorporated nor collected. Thus the procedure has the advantage of consistency over time. Similarly, the dividend imputation credit as a quasi-money receipt is not included for the purposes of ascertaining gross income inequality.

However, it could be argued that the procedure also has the result of exaggerating the increase in disposable income inequality in the period immediately following the introduction of dividend imputation, and as Table 3.1 indicates its effect was quite substantial. Conversely, of course, following this line of argument it would also have to be accepted that the reduction in the company tax rate in 1989-90 from 49 to 39 per cent, which meant that effectively tax was payable on about 10 per cent of both actual dividends received **plus** the imputation credit acted to artificially increase the reduction in disposable income inequality observable in that year, and hence the apparent increase in the progressivity of the tax system.

It is believed that the procedure which at least consistently treats company income tax as borne by consumers with zero incidence on shareholders and exogenous to the simulation to date is preferable to one which makes that implicit assumption for the years up to and including 1986-87 in the simulation and then shifts to an assumption that 100 per cent of company tax is borne by dividend recipients (at least that proportion that is franked), such that it is fully included from that point on. Indeed, the procedure followed here is consistent with that adopted by the ABS for calculation of its Fiscal Incidence study for 1988-89 (ABS, 1992) as revealed in the accompanying technical paper (ABS, 1992a).

It would seem, however, as indicated in Appendix Two, that in revising the unit record tape in March 1993 the ABS has adopted the procedure of not including the imputation credit for gross income purposes but including it for the purpose of ascertaining personal income taxable liability and then **not** deducting it as a rebate for determining actual tax paid. That is, it has taken legal liability not actuality as the basis. As Appendix Two and the above discussion indicate this has important implications on the apparent progressivity of the personal income tax system and in consequence the revealed inequality at the disposable income level. It would seem

that clarification and consistency is required in the treatment of this issue by the research community involved in microsimulation.

4.2 Quasi-simulation

As indicated in the previous section, the simulation encompasses most of the factors which impinge upon the levels of private inequality, with the exception of changes in the distribution of income within factor markets and sub-markets. Examination of, for example, wage inequality trends in the labour markets for full-time work (Raskall, 1993) suggests that these have increased over the 1980s. Indeed, given the apparent cyclical pattern evident as a result of those factors incorporated in the simulation, these intra-factor market movements - in both labour and capital - may be the principal source of the increased **trend** in inequality.

In respect of wages, then, taking the 1985-86 survey as the base would lead to an overestimate of inequality in earlier years and, to the extent such increased wage inequality continued, to an underestimate of private inequality in 1989-90. Analysis of annual wage statistics produced by the Australian Bureau of Statistics (ABS, Cat. No. 6310.0) suggests this would be a greater problem in the earlier years compared to the forward-dating period to 1989-90.

Similarly, analysis by Raskall, McHutchison and Urquhart (forthcoming) indicates that a dramatic change took place in the ownership of, and distribution within, dividend income in the period between the 1981-82 income survey and the 1985-86 income survey. This became an important source of inequality change. Further investigation narrowed this to the 1984-86 period and related it to a transfer between retired income units and higher income families comprising a couple with a head in a managerial or professional occupation. Since the basis of the simulation is the 1985-86 income distribution, back-dating of the dividend receipt pattern in this distribution is likely to overestimate the 1981-82 private income inequality prior to both the tax and social security imputations.

Detailed validation of the simulation with respect of that revealed by the various income surveys over the period of analysis in Appendix Two indicates that the **worst** feature of the current simulation relates to this 1981-82 private income inequality. Compared to the **actual** result in 1981-82, the simulation overestimates private income inequality as measured by the Gini coefficient by .011 or 2.3 per cent (comparing the actual result of .476 to the simulated .487). On the other hand, the result of the private inequality simulation in 1989-90 (with a Gini coefficient of .501) is very close to that revealed by the actual 1989-90 survey (with a Gini coefficient of .502).

If we accept that the various income surveys accurately measure this intra-factor market inequality at the private income level and that such changes are constant between surveys, then we can superimpose or graft the annual simulated results onto these underlying wage and capital market inequality trends. Thus the actual survey results for private income are taken as the base for the relevant years (1981-82,

1985-86 and 1989-90) and the simulation used to interpolate private inequality in the intervening years, that is, annual fluctuations around the revealed trend between 1981-82 and 1985-86, and between 1985-86 and 1989-90. To these results the simulated impact of the imputed social security and taxation systems are added.

Operationally, this involves ascertaining the difference between the private income Gini coefficients of the simulation and the actual survey for 1981-82, 1985-86 and 1989-90. For each period 1981-82 to 1985-86 and 1985-86 and 1989-90, the difference at the 'later' (in estimating terms) point and 1985-86 is summed and averaged over the four-year intervening period on an annual trend basis. That difference is then allocated on a pro-rata basis (based on years from 1985-86) to the private income estimate from the simulation in each year. To this quasi-simulation estimate (in that it uses the annual fluctuation revealed by the simulation to adjust the base trend revealed by the actual surveys) we then graft, or add, the outcome of the simulated social security system as revealed by the difference in the simulated private Gini coefficient and that simulated for gross income. In a similar fashion we then add the simulated impact of the taxation system (as revealed by the difference between the simulated Gini coefficient for gross income and disposable income). The result of this exercise is a set of disposable income inequality estimates which accounts for annual changes in private incomes, social security and taxation but which is based on the actual revealed trend in private incomes, so overcoming one of the current limitations of the model (certainly in the period prior to 1985-86). Admittedly, to the extent that the redistributive impact of the social security and taxation systems are related to the distributive outcome of private income inequality then this quasi-simulation will itself be slightly out. However, sensitivity analysis undertaken suggests that this is relatively minor, certainly in comparison to the apparent errors in private income inequality in the earlier pre-1985-86 period.

For those interested in using the annual data presented in this Report, this represents our current best estimate of the pattern of change in inequality at the disposable income level over the 1980s, as measured by the Gini coefficient. The base-data relating to equivalent disposable income is utilised to produce Figure 4.1. Table 4.3 reproduces the data for all income concepts.

What becomes apparent from examination of Figure 4.1 and Table 4.3, reflecting the cyclical nature of private income inequality compounded by government redistributive impact, is the operation of a **ratchet effect.**

Private inequality increased rapidly in 1982-83, then stabilised to 1985-86, then rose rapidly again in 1986-87, steadied and actually declined. With the intervention of the cash-transfer system, dispoable income inequality followed an upward trend with peaks above the trend between 1981 and 1985 and again between 1987 and 1990 (Figure 4.1). This highlights the dangers of merely taking survey results at intermittent times as indicative of trends. It is only by coincidence that such surveys will occur at the same point in this cyclical/ratchet movement.

Figure 4.1: Disposable Income Inequality: 1981-82 to 1989-90
(Incorporating trend changes within labour and capital markets)

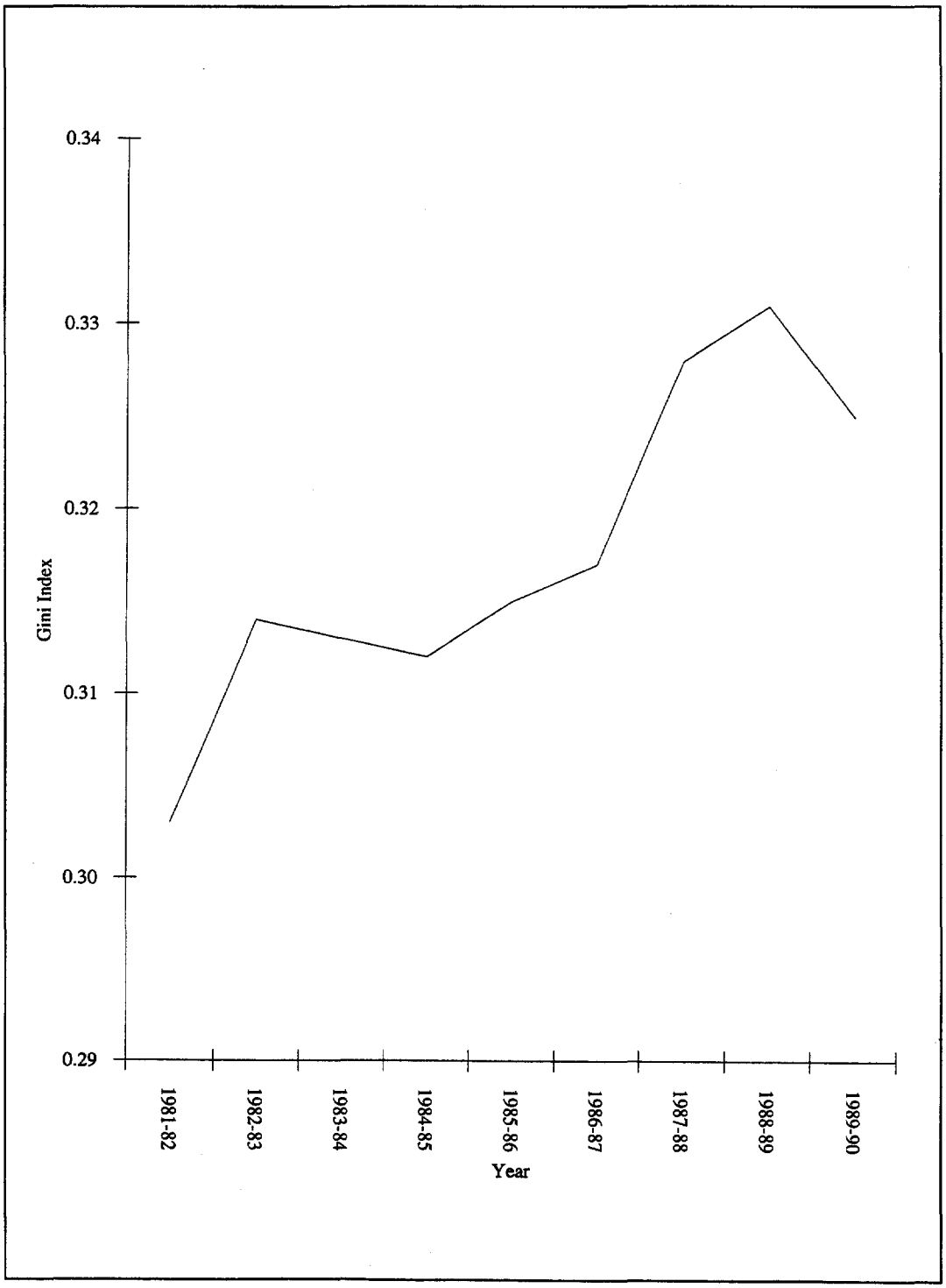


Table 4.3: Quasi-simulated Equivalent Income Distributions, Gini Coefficients: 1981-82 to 1989-90 (Incorporating trend changes within labour and capital markets)

Year	Private	Gross	Disposable	Final (Budget)	Final (Public Sector)
1981-82	.476	.357	.303	.284	.259
1982-83	.496	.367	.314	.294	.270
1983-84	.503	.369	.313	.291	.268
1984-85	.506	.369	.312	.285	.263
1985-86	.505	.374	.315	.289	.266
1986-87	.510	.378	.317	.291	.268
1987-88	.509	.376	.328	.302	.278
1988-89	.503	.375	.331	.301	.282
1989-90	.502	.373	.325	.295	.277

We can thus begin to understand the impact of the business cycle on private inequality and consequent government redistributive measures. If we take wages, unemployment and inflation as the indicators of cyclical economic change, then at the private income concept level, a downturn could well see pressure put on wages particularly for those in more flexible labour market relations, those in the marginalised workforce or on overtime. This is likely to, at a slow rate, increase inequality. As the economic downturn turns into a recession then the burden of increased unemployment could be expected to fall initially on these lower income and marginalised groups (part-time and casual workers). This would quicken the impact of increased inequality and it would rise quite dramatically. Ultimately, as the recession deepened unemployment could be expected to become more widely spread across the wage-earning sector, and the rate of increase in inequality would begin to slow. However, the highest decile containing fewer wage-earners would increase their share, particularly if the profit share increased.

On the other hand, if the economy was in a mild upswing, those with jobs would get increased wages with longer hours worked so private inequality might be expected to increase initially. As the upturn gathers momentum, and those without jobs get employment we could expect inequality to begin to decrease dependent upon the structure of the labour market. As inflationary pressures mount, the impact is likely to be more diverse, dependent upon the nature of the wage setting mechanism and the consequent trends in non-wage income.

Increased unemployment concentrated in the lower (third and fourth) deciles and possibly reduced participation rates are likely to increase social security expenditure so that the cash transfer system becomes apparently more redistributive. With inflation, under a centralised wage-fixation system linked to price changes and a social security system encompassing pension and benefit indexation, the impact is likely to be minor, except insofar as eligibility might be reduced through asset-price inflation and the operation of an assets test. If pensions were not indexed, then the

reduction in their real value would rapidly reduce the redistributive role of social security and gross income inequality would rise.

As private incomes declined in a recession, total tax revenue would be reduced and the apparent redistributive impact of the tax system would also be reduced, at least from its potential. With inflationary pressures an unadjusted income tax system with less than full indexation would result in the phenomenon of bracket creep, particularly for those at the tax threshold (that is, the lower end of the distribution) but also to others, as more of their income was subject to the top marginal rate.

Responses at the social wage expenditure level would depend on attitudes to the deficit and possible 'crowding out' in inflationary times. Certainly, the demand for social wage would increase at times of increased unemployment and inequality through their documented impact on health and crime and possibly on education as retention rates increased with reduced employment opportunities.

In summary, in response to a downturn we could expect an initial rise in private income inequality increasing rapidly then steadying. The greatest impact would be on the third and fourth deciles. As this occurred, redistribution through both the social security and social wage systems might increase but this would be countered by reduced redistributive capacity of the tax system. The outcome would very much depend upon attitudes to deficit spending, or pressure to reduce eligibility to social cash and non-cash benefits. In response to inflationary pressures, an initial increase in inequality particularly through asset-prices and non-wage income could give way to a far more diverse and less certain trend in inequality.

Such a hypothesis would indeed lead to a ratchet-type movement in inequality, characterised by sharp-steep increases at the initial point of change in economic direction. Evidence from the quasi-simulation suggests two sharp increases in private income inequality in 1981-82 and 1986-87, translating at all income concepts into an increase, although mitigated by government action. According to the analysis of Saunders (1992b) a third sharp increase probably occurred in 1991.

The key point is that it is only through the availability of annual data that more rigorous testing of these hypotheses can be undertaken. (See Nolan, 1987 and 1988, in respect of the UK and Blinder and Esaki, 1978 in relation to the US.) Present reliance on trend data emphasises the analysis of trend (that is, longer-term) factors giving rise to inequality. Yet, as Figure 4.1 indicates, there are significant, almost cyclical, fluctuations around this trend. Attempts to disentangle these structural and cyclical factors in Australia (Nevile et al., 1990 and Saunders, 1992b), have been hampered by the lack of such annual data. Microsimulation-based descriptive analysis at least provides the opportunity to develop such data, for subsequent hypothesis testing. Whilst conceptual difficulties exist in using such results to examine links with macroeconomic cyclical data because, in part, that data are used to generate such results, in the absence of other data they at least provide the basis for more rigorous examination of this critical connection.

The development of such annual data series in this Report concomitantly requires a consideration of possible deficiencies in the raw data produced by the microsimulation. Thus, we have felt the obligation to provide this 'best-estimate' series of inequality measures which would seem to incorporate some of the within-factor market inequality trends not currently adequately incorporated in the presently calibrated microsimulation to enable other researchers to further pursue these macroeconomic connections.

Whilst space does not enable us to outline some of our investigations in this direction in this particular Report, examination in the previous chapter of the distributional impact of the 1982-83 recession would seem to add support to the tentative conclusions of Saunders (1992b). Indeed, rudimentary time-series analysis over the entire 1981-82 to 1989-90 period suggests, at the private income level, the particular susceptibility of the lower-middle deciles to changes in unemployment and the far more complex and diverse impact of inflation, possibly with the operation of leading and lagging temporal factors.

4.3 Links to Social Phenomena

The annual estimates of income inequality make possible closer examination of the connection between economic inequality and social phenomena.

Conventionally, work in the fields of health (or rather ill-health) and of crime has examined the effect of economic deprivation on social manifestations by reference to cross-sectional cohort data. The National Health Strategy (1992) provides a recent review of Australian and overseas literature in relation to health inequalities in terms of mortality and various morbidity patterns. Weatherburn (1992) examines and reviews the literature on the relationship between economic conditions and criminality. In the studies cited in each area, the incidence of illness, disease, mortality or various crimes in an economically deprived cohort is compared to the incidence in the more general population. At a more aggregate scale, indices of health and crime rates are compared with economic well-being indices on a spatial basis to enable inference between economic deprivation and social manifestation to be drawn. (See Devery, 1991; and Taylor et al., 1992, as illustrative of recent Australian studies.)

Most of these cross-sectional studies support a strong association between various socio-economic indices and rates of crime and ill-health. The few time-series studies (usually using unemployment as the variable for deprivation) are less conclusive with debate surrounding model specification and data deficiencies, although Kapuscinski, Chapman and Braithwaite (1991) in resolving these issues find empirical support for a positive association between unemployment and a specific crime type - homicide.

More recently, subject to data difficulties, analyses in the area of health and criminal activity have begun to focus more on the relationship between measures of inequality (as distinct from **absolute** measures of poverty, income and

socioeconomic variables). Using the LIS international data set Wilkinson (1992) found a positive significant association between income inequality (as measured by the Gini coefficient) and mortality. Similarly, for the United States, the review by Box (1987) reports that the majority of cross-sectional studies into crime showed that higher levels of income inequality were associated with higher crime rates in a relationship much stronger than that concerning the relationship between unemployment and crime (Weatherburn, 1992: 5). In relation to criminal activity in Australia, Braithwaite (1978) has argued conceptually that inequality fundamentally underpins crime.

Such research, however, lacks empirical support in the absence of consistent, regular and frequent data on income inequality. The provision of annual inequality data enables the use of time-series analysis to examine more directly this relationship between aggregate inequality and various social phenomena, which it must be remembered have an explicit economic cost over and above the cost to the individuals affected in terms of stress, self-esteem and poverty.

As an illustration of the potential for research utilising the results of the microsimulation, we could hypothesise that increases in inequality of income in people's hands (disposable income) might increase financial stress for some people which could translate into emotional stress erupting in the violent form of either suicide or homicide. Whilst many other environmental and psycho-social factors may be expected to impact on this (for example, marital tension, prolonged unemployment, and depression), it could be argued that these, in turn, have a causal response in relative economic deprivation.

The next step is to examine the correlation between economic inequality (as measured by the annual Gini coefficient for disposable income between equivalent income units from our quasi-simulation) and the crude rates for homicides and suicides in Australia.

The results at first glance are dramatic. On a single regression of inequality against the rate for all homicides in Australia each year from 1981-82 to 1989-90, the variation in disposable income inequality was positively associated with variations in homicide with a correlation coefficient of .929, with a level of significance of much less than one per cent. The inclusion of other variables such as unemployment or inflation, or a trend variable did not significantly alter this result. Similarly, regressing inequality against the rate for all suicides, produced a positive association, again significant at the one per cent level, with a correlation coefficient of .794.

When the analysis was extended to examine the association between income inequality and homicides and suicides by gender, this significant relationship was maintained, with the exception of female suicides. Suicides by women varied more in accordance with inflation rate in the 1980s. In all cases this relationship with inequality was more significant than that revealed with the unemployment rate which was in fact usually statistically insignificant and often in the reverse sign to that which might have been expected.

Dissection of the homicide rates for male and female victims gives some clue as to why unemployment in the aggregate appears insignificant for all homicide victims. On its own, it is only significant for male homicides at the five per cent level and not for female homicides. However, when added in a multiple regression to our inequality measure, it becomes significant at the one per cent level (t-statistic) and marginally adds to the explanatory power of the two variables in respect of both male and female homicides. The gender distinction, however, is notable. Inequality being held constant, an increase in unemployment increases murders of women but decreases those of men, for the period studied. The implications of this for gender violence are important and deserve further analysis.

Such regression analyses must, of course, be regarded with caution, until more complete models of causal links are developed. They are mere statistical associations rather than confirmation of causal relationships. However, the availability of such annual inequality data does enable more complete examination of causal hypotheses to be undertaken.

5 The Social Wage and Its Distribution

5.1 Conceptual Definitions of Income

To date, our analysis has solely concerned itself with changes in living standards and resultant inequality at the cash-only disposable income level. Whilst this has traditionally been the principal basis for such analysis, and indeed forms the basis for poverty line adjustment, it has largely been for operational and data availability reasons rather than a philosophical view that it is 'cash or money-only that counts'.

However, if measurements of the distribution of income are to be considered as central to the evaluation and formulation of economic and social policies, and indicators of the success, or otherwise, of government policies in achieving widely shared goals of equity and efficiency, then the definition of income and what is or is not included clearly matters. In that regard, inevitably a cash-only measure of the distribution of income will obscure certain dimensions of the true distribution of well-being.

There can be little doubt that in a market-exchange based economy, access to and receipt of money income in exchange for factors of production determines the extent to which individuals and families can participate in the product markets and thus participate in that society. However, beyond this primary distribution as we have already seen, government intervenes through the raising of taxes and the disbursement of cash transfers in the form of social security, to ensure that those unable for reasons such as age or disability or economic conditions to sell their factors of production (embodied in themselves) are not excluded from such participation. The outcome of such transfers, disposable income, provides then the basis from which we can determine absolute and relative living standards and inequality reflective of unconstrained choice in those product markets.

However, not all primary income is received in cash form. Increasingly most people also receive payment-in-kind, either in the form of fringe benefits (involving both elements of current consumption and consumer durables) or in the form of deferred compensation such as superannuation contributions by an employer. That such payment-in-kind represents income that determines living standards and thus levels of inequality is apparent by consideration of what is known as the 'Haig-Simons' economic definition of income. This definition, which has formed the philosophical basis for most income tax legislation, takes as its conceptual base a recognition that income is the embodiment of power of command over economic resources backed by property rights. Such power of command enables people to acquire and retain things, or use services, that provide, at an individual level, utility or happiness and, within a social framework, prestige, status and the capacity to generate further power (income).

Thus Haig (1921) defined economic income as 'the increase or accretion in one's power to satisfy wants in a given period in so far as that power consists of (a) money itself, or (b) anything susceptible of valuation in terms of money' (Haig, 1921: 43). Money is seen here not merely as a cash commodity in its own right but also as the common commodity (or standard) for assessing relative values. For operational purposes, Simons (1938) extended Haig's conceptual definition as income being the sum of:

- the market value of rights exercised in consumption; and
- the change in the value of the store of property rights between the beginning and end of the period. (Simons, 1938: 50)

In other words, economic income is seen comprehensively as the sum of consumption and change in net worth, that is, the accretion in a person's command over economic resources and goods and services. Thus if our interest is economic well-being and its distribution then 'income' should include any receipt, whether in cash or in-kind (through consumption), as an accretion to economic power.

It should be noted that, whilst this is notionally cast in the language of market value, it does not mean that consumption must arise through a market transaction. The key is the ability to exercise command over resources. Thus, goods and services received outside the market mechanism become part of this comprehensive income definition.

Such a definition representing economic well-being in its true sense, would include not merely the cash-only regular receipt encompassed in current ABS income surveys, but also non-cash receipts in the form of private fringe benefits and the results of household activity (depending on the unit of analysis adopted). Within private income it would also extend to include accrued as well as realised capital gains on assets owned within a period and the imputed, as well as actual, income from the ownership of such assets (such as owner-occupied dwellings). Other irregular income sources such as bequests and gifts would similarly become part of income if they added to a person's or family's command over economic resources. (See Yates, 1992; and Raskall, forthcoming a, for attempts to ascertain the distribution of the imputed rent on owner-occupied dwellings and the distribution of private fringe-benefits, respectively).

Others might wish to expand this economic definition still further into a broader income concept by incorporating other non-market factors such as degree of social interaction, access to leisure, environmental quality and others generally reflective of the interaction of the 'social' and the 'individual' (Travers and Richardson, 1993; and Brownlee, 1990).

5.2 The Social Wage as an 'Income Concept'

Just as private income can be seen to embody more than mere cash-money and include in-kind receipts and transfers, so too can income received from government through redistributive activity.

Whilst cash pensions and benefits provide access to the market-economy to consume goods and services, goods and services can also be provided by government on an in-kind basis where no market has been formed or where the goods or services are considered so important to a person's well-being that denial of access to the goods or services in the market because of affordability or cash-income constraints would undesirably affect social and economic goals of efficiency and equity. Obvious examples of this include school education, health, and housing. Undeniably also, in-kind transfers ensure that use is in fact made of those goods or services when there is doubt that if the capacity for use is provided in the form of a cash-transfer, that the exercise of 'freedom of choice' may not result in appropriate or sufficient actual use. In-kind transfers assure the ascendency of social goals over individual goals.

The mechanism, and quantum amount, by which government provides such transfers is through the expenditure side of the Budget and the priorities reflected therein. Within this overall expenditure context, the non-redistributive state is clearly a myth. Whilst cash transfers in the form of social security and taxation are the overt mechanisms by which the government can redistribute income, all government spending (and indeed all taxation, as indicated in Section 4), particularly if directed to specific individuals, can act to redistribute well-being and living standards.

Given that in Australia social security cash transfers constitute, on average, only about half of the taxation revenue raised directly from individuals as personal income taxpayers (see Table 5.1), the exclusion of non-cash benefits could well distort inferences about changes in inequality and living standards. In particular, since such non-cash benefits tend to be directed to individuals on the basis of some defined characteristic, their exclusion could well distort interpretation of relative living standards and consequent inequality measured between family types.

Whilst all forms of government expenditure provide some direct or indirect benefit to particular individuals or households, that part of government spending which more explicitly provides these benefits has become known by the term the 'social wage', although as Norris (1990) notes 'there can be no clear dividing line between expenditure on the social wage and other government expenditure' (Norris, 1990: 1).

As in all analytical struggles between conceptual principle and operational capabilities, a 'principled compromise' must be found. And whilst any definition of the dividing line for inclusion and exclusion must be to some extent arbitrary, it is usually determined by data availability, in respect both of aggregate value data and the requirements for the necessary imputation procedure to allocate expenditure to specific individuals.

Table 5.1: Social Wage Expenditure[a]: 1981-82 to 1989-90

	Health	Education	Social Wage (Non-cash)	Social Security	Personal Income Tax (including Medicare Levy)
1981-82	6956	5226	12182	11571	21204
1982-83	7696	5861	13557	14178	22942
1983-84	9229	6550	15779	16547	24691
1984-85	11342	7116	18458	17989	29287
1985-86	12531	7791	20322	19354	32713
1986-87	13994	8227	22221	20739	38061
1987-88	15351	8583	23934	22738	41875
1988-89	17097	9485	26582	23983	47536
1989-90	18720	9918	28638	26350	50019

Note: a) $ million, nominal.

Source: Health and Education: Derived from ABS Cat. Nos 5502.0; 5504.0; 5510.0; 5512.0 (see Appendix One)
Social Security: Budget Paper No. 1, Statement No. 3, various years.
Income Tax: Budget Paper No. 1, Statement No. 4, various years.

Most operational definitions of the social wage include cash income transfers in the form of social security transfers. For our analysis here these are included separately and have been incorporated in the cash-only concept to date. Thus we concentrate on, and define the social wage as, **non-cash** benefits financed by government.

Clearly the more aggregate the analysis and the less research is concerned with individual living standards or overall differences in the distribution of standards, the broader the operational definition that may be adopted. Thus Harding (1984) and Norris (1985, 1990) who are more concerned with aggregate or average levels and trends adopt a broader set of inclusions than our analysis, which in allocating specific expenditure to individuals and income units in the micro-simulation, requires recognition of the data requirements and availability to do so.

The Australian Bureau of Statistics, drawing from data collected in the Household Expenditure Surveys of 1984 and 1988-89 used a more comprehensive definition of what it called 'indirect benefits', for imputations it made of the distribution of such benefits in what have become known as its Fiscal Incidence Studies (ABS, 1987 and 1992).

However, like their counterparts in the Income Distribution Surveys, these valuable studies are 'snapshots' at a point in time rather than indications of changes in levels of resultant living standards and inequality over time. As the cash-only analysis in Section 3 indicated, significant fluctuations occurred over the 1980s by different income concepts.

5.3 Allocating the Social Wage

As McHutchison and Urquhart (1992) and Saunders et al. (1992c) point out, a number of conceptual and methodological issues arise in such social wage analysis of government spending. These include appropriate valuation of such benefits, the treatment of capital and administrative costs, the appropriate time period to allocate capital expenditure, and the basis of identification of recipients (actual utilisation or potential for utilisation, akin to insurance). (See Smolensky et al., 1977 and Paglin, 1980). On these a myriad of empirical difficulties are superimposed.

Space does not permit, a full discussion of all these methodological issues in this Report. Indeed, like many issues in welfare and cost-benefit analysis, there is no clear-cut resolution for many of these conceptual and methodological issues, and operationally, most tend to be resolved by the availability of data. Ideally, we can conclude that benefits should be valued on the basis of utility-value to recipients, but that begs the question of how that is measured and whether, in the absence of an alternative market-exchange value, the shadow-price can be determined from which the actual subsidy involved in the transfer can be ascertained. In reality we are obliged to accept expenditure data on the basis that this represents the opportunity cost to government. Similarly, whilst we may wish to allocate capital expenditure over the economic life of the asset we are often left with little indication of the appropriate depreciation or discount rate. This in turn raises also the dilemma as to whether the mere availability of a facility such as a school or hospital improves our welfare even if we are not currently utilising it. In the case of a hospital having one available can be seen as akin to insurance.

Such issues aside, for the purposes of the simulation and this Report, we assume that benefit is measured by annual expenditure including both that of a current and a capital nature, and that the basis for the allocation of that social wage benefit is determined by actual utilisation of that expenditure. This is similar to the procedure adopted by EPAC (1987) and the ABS in its two fiscal incidence studies (ABS, 1987 and 1992).

In determining which aspects of government expenditure are to be incorporated in the social wage we take a minimalist unambiguous definition by including all health expenditure by the public sector and expenditure on primary and secondary education only, at this stage. However, there is no reason why at a later stage other elements such as housing and transport expenditure cannot be included, subject to appropriate aggregate and allocative data availability.

Whilst the coverage is less than the total of 'indirect benefits' included in the ABS fiscal incidence studies, these two items, health and school education, comprised 68 per cent of the value of all indirect benefits from the 1984 study (ABS, 1987) and 73 per cent of that value from the 1988-89 study (ABS, 1992).

Table 5.1 details public sector expenditure on health and education, as well as Budget expenditure on social security and receipts of income tax over the 1980s. In

broad aggregate, cash-benefit transfers averaged about 50 per cent of individual income tax revenue and non-cash benefits about 60 per cent during the 1980s.

As outlined in Appendix Two, health expenditure was allocated on the basis of age-related utilisation rates taken from EPAC (1987), and education (school) expenditure on a per capita basis per school-aged child. Thus, age and presence of children become the basis whereby income units are allocated social wage expenditure in the simulation. In consequence, the distribution of this expenditure by income units reflects both these factors and the location of such income units in the distribution of money income.

5.4 Relative Significance of the Social Wage

Relative to money-income as measured by disposable income, Table 5.2 outlines the percentage of disposable income received in social wage expenditure, in health and school education in each year since 1981-82. This table also includes social security expenditure and the combined total in the broader social wage expenditure.

Almost one-third of disposable income in money terms is received from government sources either in cash form through social security payment or in kind through the provision of social wage expenditure. Slightly more on average is received in kind through health and education than in cash form.

Table 5.2 shows that the peak in social wage expenditure relative to disposable income occurred in 1986-87 with significant discrete increases occurring in 1982-83 and 1984-85, particularly stemming from health expenditure changes.

5.5 Distribution of Social Wage Expenditure

The distribution of health and school education expenditure by itself tells us little other than the demographic composition of the population of income units. Far more significant for the purposes of this paper is the distribution of these items of social expenditure in relation to the distribution of cash income, in particular disposable income.

Limiting analysis to the non-self-employed population and using 1989-90 as an example, in Table 5.3 we outline the nominal value of this expenditure on health and education, and the combined total by decile of unadjusted disposable income received. In the final column the decile mean is related to the overall mean average social wage allocation. Thus, those with incomes in the first decile of unadjusted disposable income received on average $1871 in health expenditure allocation and $169 in education. The total mean allocation of $2040 represented just 59.5 per cent of the overall average for all income units.

Table 5.2: Relative Significance of the Social Wage, Percentage of Disposable Income: 1981-82 to 1989-90

Year	Health	Education	Social Wage Expenditure	Social Security Payments	Social Wage and Social Security
1981-82	8.0	6.0	14.0	13.3	27.3
1982-83	8.4	6.4	14.8	15.5	30.3
1983-84	8.7	6.2	14.9	15.5	30.4
1984-85	10.4	6.5	16.9	16.4	33.3
1985-86	10.4	6.5	16.9	16.0	32.9
1986-87	10.9	6.4	17.3	16.2	33.5
1987-88	10.8	6.0	16.8	15.9	32.7
1988-89	10.7	5.9	16.6	14.9	31.5
1989-90	10.6	5.6	16.2	14.9	31.1

Table 5.3: Allocation of Social Wage by Unadjusted Disposable Income Decile ($): 1989-90

Decile	Health	Education	Social Wage	% Overall Mean
1	1871	169	2040	59.5
2	2580	145	2725	79.4
3	2650	459	3109	90.6
4	2950	481	3430	100.0
5	2156	650	2806	81.8
6	1705	711	2416	70.4
7	1968	1664	3632	105.9
8	2116	2453	4569	133.2
9	2210	2623	4833	140.9
10	2278	2471	4749	138.4
Mean	2248	1183	3431	100.0

Superficial examination of this table would suggest that it is higher-income recipients who are the prime beneficiaries of this social wage expenditure, particularly on education. The bottom six deciles all receive substantially less than the mean allocation of education. On the other hand, the eighth, ninth and tenth deciles all receive more than twice this mean average education expenditure.

However, this occurs because larger families particularly couples with children predominate in these upper deciles. In the ninth decile, for example, couples with children comprise 54 per cent of the total income units and childless couples a further 34 per cent. Conversely, the lower deciles are dominated in unadjusted income terms by single people, over 90 per cent of income units in the bottom decile are single, 39 per cent of them under 25 years of age and 24 per cent over 65. Less than 2 per cent comprise couples with children.

Whilst the incomes of these larger families is greater in unadjusted terms, so too are their 'needs' for such income. Consequently, it is more appropriate to examine the distribution of social wage allocations in relationship to the **equivalent** disposable income each income unit received, to reflect family needs and economies of scale. As previously the OECD (1982) equivalence scale is utilised. Table 5.4 outlines this equivalent income (in-kind) received in health and education by decile of equivalent disposable income, for each year of analysis.

With this adjustment it becomes apparent that, again taking 1989-90 as illustrative, that as far as health expenditure is concerned, the benefit is concentrated in the bottom four deciles with the greatest absolute benefit going to the second decile. This largely reflects the age structure of income units in these deciles, although this is more closely related to income. For the top five deciles, the allocation in equivalent terms averages much the same. On the other hand, allocation of education spending peaks in the fifth decile and its distribution tapers from there in a shape akin to a normal curve. The exception to this is the first decile which contains the highest proportion of sole parents, with consequent education benefit, and receives the second highest mean allocation in equivalent terms. These patterns are graphically illustrated in Figure 5.1 for 1989-90 but as Table 5.4 indicates the same pattern broadly holds across all years considered.

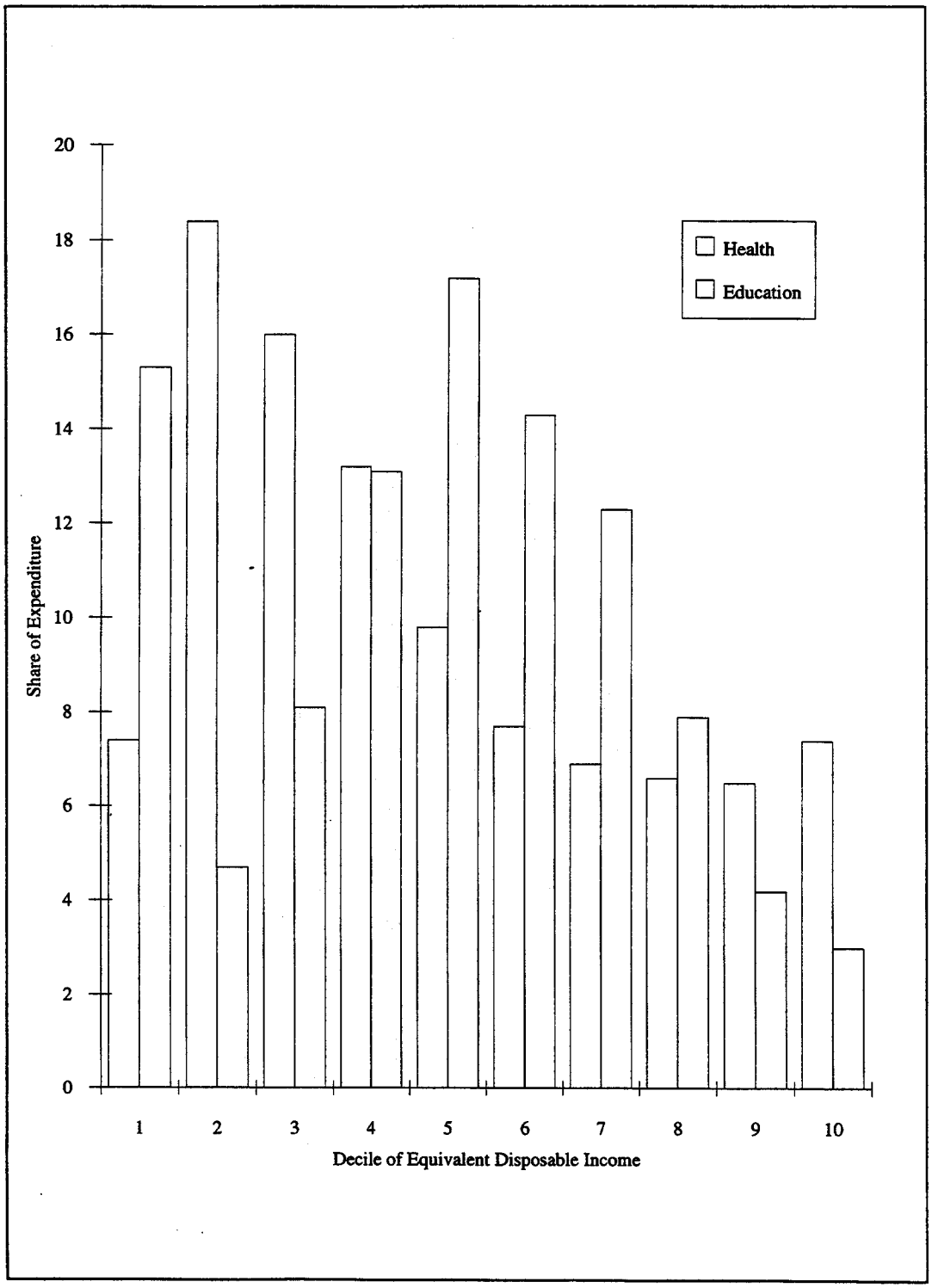
As far as Table 5.4 is concerned, it should be noted that the distributional pattern reflects more on the composition of each equivalent disposable income decile than it does on differential per capita allocations. Nevertheless it is precisely that demographic composition that makes the social wage an important aspect of the broader concept of income inequality. If all deciles were demographically the same and each eligible person or child received the same allocation then each decile would receive the same allocation i.e. ten per cent of the total allocation. Whilst the second of those conditions (that of equality of allocation if eligible) holds in the assumptions inherent in the allocation procedure, the first clearly does not. In consequence, the social wage is distributed differentially to the deciles. One measurement indicator that can be utilised is the Concentration Ratio which is akin to the Gini coefficient. Thus if each decile received exactly the same share the Concentration Ratio would have a value of 0.000. The extent to which it deviates from this indicates both the extent of concentration in particular decile(s) (its quantum amount) and the degree to which it is directed more to higher or lower-income recipients (its sign). In all years, both the health, education and the combined social wage provided a negative sign reflecting the bias in allocation to those income units who are income-poor, or rather the fact that those income units who are income-poor are more likely to be in receipt of such allocation.

Looking at the age-based health allocations in Table 5.4, what is noticeable are the dramatic shifts in the early 1980s, such that the Concentration Ratio fell from .164 in 1981-82 to .097 in 1983-84 (that is, health allocations become more equally distributed across deciles). Since 1983-84 the share in the first and second deciles has increased, indicating a more dramatic ageing of these deciles (since health is

Table 5.4: Distribution of Social Wage by Equivalent Disposable Income Decile: 1981-82 to 1989-90

Decile	81-82	82-83	83-84	84-85	85-86	86-87	87-88	88-89	89-90
Health									
1	7.8	6.8	6.9	7.3	7.3	7.1	7.3	7.5	7.4
2	19.6	17.3	16.3	16.8	18.0	17.0	17.2	18.2	18.4
3	17.1	17.7	18.0	17.1	16.6	16.9	17.3	16.2	16.0
4	11.5	13.2	13.6	13.6	13.3	13.5	13.4	13.3	13.2
5	9.3	9.6	9.9	10.0	9.7	9.6	9.8	10.0	9.8
6	7.4	7.8	7.9	8.1	7.8	8.1	8.0	7.6	7.7
7	6.8	6.8	6.8	6.8	7.0	7.0	6.7	7.0	6.9
8	6.6	6.8	6.8	6.8	6.6	6.8	6.7	6.5	6.6
9	6.8	6.8	6.7	6.6	6.5	6.6	6.6	6.5	6.5
10	7.1	7.2	7.1	7.0	7.2	7.3	7.1	7.3	7.4
10	7.1	7.2	7.1	7.0	7.2	7.3	7.1	7.3	7.4
Concentration Ratio	-.164	-.145	-.097	-.149	-.152	-.142	-.152	-.154	-.150
Education									
1	15.3	15.4	16.6	16.9	17.2	17.8	17.6	16.2	15.3
2	3.8	6.6	6.7	6.5	5.2	6.1	5.7	5.2	4.7
3	8.4	6.2	6.3	6.9	7.3	6.4	7.0	7.9	8.1
4	14.0	12.7	11.8	11.3	12.4	11.9	11.7	12.3	13.1
5	16.9	15.5	15.6	16.0	16.6	16.0	16.1	17.1	17.2
6	13.4	14.9	14.6	14.9	15.4	15.2	14.6	14.1	14.3
7	11.9	11.9	12.9	12.8	11.9	11.8	11.9	11.2	12.3
8	8.4	9.2	8.1	7.7	7.3	8.0	8.0	7.5	7.9
9	4.9	4.8	4.8	4.5	4.3	4.0	4.2	4.7	4.2
10	2.9	2.8	2.6	2.6	2.4	2.7	3.2	3.9	3.0
Concentration Ratio	-.113	-.114	-.128	-.136	-.142	-.143	-.136	-.123	-.121
Social Wage									
1	9.9	9.3	9.6	9.6	9.7	9.7	9.7	9.5	9.2
2	15.2	14.3	13.7	14.3	14.9	14.4	14.5	15.2	15.4
3	14.7	14.4	14.8	14.6	14.3	14.4	14.9	14.3	14.2
4	12.2	13.1	13.1	13.0	13.1	13.1	13.0	13.1	13.2
5	11.4	11.3	11.4	11.5	11.4	11.2	11.2	11.6	11.4
6	9.1	9.9	9.7	9.8	9.7	9.8	9.6	9.1	9.2
7	8.2	8.2	8.5	9.3	8.2	8.2	7.9	7.9	8.1
8	7.1	7.5	7.1	7.0	6.8	7.1	7.0	6.7	6.9
9	6.3	6.2	6.2	6.1	6.0	6.0	6.0	6.1	6.0
10	5.8	5.9	5.9	5.9	6.0	6.2	6.2	6.6	6.4
Concentration Ratio	-.151	-.139	-.140	-.147	-.150	-.144	-.147	-.147	-.145

Figure 5.1: Distribution of Health and Education Expenditure: 1989-90



allocated on an increasing function of age basis). For the second decile, the share of health spending increased from 16.3 per cent in 1983-84 to 18.4 per cent in 1989-90. Conversely, though, largely reflecting changes in relative living standards by age, the share of the third decile declined from 18.0 per cent to 16.0 per cent (that is, it become, on average, younger).

The child-specific basis for allocating school education expenditure similarly indicates the dispersion of families with children amongst equivalent disposable income deciles. Reflecting, in part, the relative changes in living standards noted earlier in Section 3, it indicates an increase in families with children in the bottom decile to 1987 (reflected in the increased share of education spending going to this decile of equivalent disposable income). However, with the introduction of the Family Package, the proportion of families with children in the lowest decile decreased, and indeed in the second decile and consequently so did the share of education expenditure going to those deciles.

Again, the recession of 1982-83, has a significant discrete impact as the shares accruing to the second and sixth deciles increased but the share decreased in the third, fourth and fifth, in particular. By inference we can observe the polarisation of families with children: some moving up; some moving down; and the middle 'shrinking'. Since 1982-83, the increase in the third and fifth deciles probably reflects increased part-time and full-time employment opportunities for married women. Overall, the movement in the Concentration Ratio for education spending by cash-income decile reflects the U-shaped pattern observable for overall inequality as measured by the Gini-coefficient in Figure 3.1 above.

Combining both components of the social wage in the final segment of Table 5.4, so that it implicitly reflects both age and children, the Concentration Ratio is virtually unchanged. The only trends apparent are the increase since 1983-84 in the second decile, and from 1982-83 the decrease in the eighth and ninth but increase in the tenth.

Combined together the age and child patterns merge, given relative total expenditure, to ensure that the prime beneficiaries of the social wage expenditure, per se, are the second to fifth deciles inclusive, in equivalent income terms. However the pattern of distribution is far more dispersive than other forms of government activity such that even the tenth decile received 64 per cent of the overall mean in 1989-90 whereas the 'peak' second decile received only 53 per cent more than that mean average.

This raises a further important methodological point in the appropriate treatment of the social wage for comparative analysis. We have accepted in Section 3 that for comparison purposes, cash-money income and transfers should be equivalenced to reflect different family needs and economies of scale. And, again, in the section just above we adopted the same principle. However, the question must be put as to whether it is appropriate to equivalence a non-cash benefit, given that an allocation of the social wage is based on the characteristics of a particular person in the income unit, by their age. No economies of scale seem to be applicable nor can the

allocation be transferred to satisfy other needs. Saunders et al. (1992) reporting on comparative non-cash benefits under the auspices of the Luxembourg Income Study 'graft' per capita social wage expenditure onto an equivalent disposable income concept. The converse argument against such a procedure is that it makes an artificial distinction between 'broad' income received on the basis of the mode of receipt. Whilst the issue is not readily resolvable, it is related to the vexed questions of the appropriate basis to value all in-kind benefits to recipients. In principle, such in-kind benefits should be valued at recipient not market value. Operationally, market value is usually taken as a proxy for recipient value.

Part of the difference occurs because of their lack of fungibility (that is, exchangeability). As Saunders et al. (1992) infer, this occurs within income units, but it also occurs between such units. Hence the adjustment they make. However, using an opportunity cost basis for assessment of recipient value, the provision of benefits (in-kind) through social wage expenditure such as health and education that would otherwise have to be paid out of other cash-income received, suggests that such provision 'frees' up that other income to meet needs for which economies of scale do apply. Given legislation for compulsory school attendance and the 'necessity-nature' of health utilisation, the case can be made that the valuation of these 'in-kind' benefits in terms of 'recipient-opportunity cost' valuation should be on an equivalent rather than per capita basis.

On balance, in an irresolvable situation since all such values are a proxy, in the interests of consistent treatment of all forms of income within the comprehensive definition outlined in Section 5.1 we have maintained the equivalent basis of valuation in the subsequent analysis. We do, however, include Table 5.5 which compares the per capita and equivalent income allocation distribution by equivalent disposable income decile for 1989-90 so that the reader can assess the impact of this methodological assumption. This comparison in Table 5.5 indicates a similar pattern of social wage allocation, particularly to the second to fifth deciles, which should not dramatically affect the conclusions derived.

In consequence of the age-related health utilisation rates and child-related education bases for allocating this (admittedly selective) social wage expenditure, then the relative significance of this expenditure compared to cash-income will vary both between income unit types and, depending on their relative position in the overall distribution, between equivalent income deciles. Table 5.6 outlines the percentage of disposable income received in social wage expenditure, in health and in school education in each year since 1981-82 by each decile of income units, ranked by equivalent disposable income.

In 1989-90, all income units received on average the equivalent of 10.4 per cent of their after-tax equivalent cash income in allocated health expenditure. In addition they received, on average, 3 per cent in equivalent income terms of that cash-income in education allocation. However, the notable aspect is the significance of such allocations proportionally to cash-income for those income units in the lowest

Table 5.5: Comparison of per Capita and Equivalent Income Allocation of Social Wage by Equivalent Income Decile: 1989-90

	Social Wage Allocation	
Equivalent Disposable Income	Equivalent	Per Capita
Decile		
1	9.2	10.7
2	15.4	15.1
3	14.2	14.0
4	13.2	12.1
5	11.4	10.7
6	9.2	9.0
7	8.1	8.3
8	6.9	7.1
9	6.0	6.3
10	6.4	6.6
Total	100.0	100.0

deciles. In part, this is an inevitable result of a roughly equal per capita allocation to an unequally distributed cash-income. However the extent, particularly in deciles one to four (for example health where the allocation is at least 20 per cent of cash income) suggests that the distribution of its impact on broader income inequality is likely to be significant.

5.6 Social Wage Expenditure by Level of Government

Aside from separately considering the distribution of social wage expenditure by its two defined component elements, health and school education, the data also enable separate consideration of these expenditures by level of government.

In Australia, under the federal system, a constitutional division of functions occurs between the various levels of government, which can give rise to conflict in that it is not matched by a corresponding division between public revenue and resources. In general, State governments are responsible for the direct provision and management of infrastructure of public services such as education, health, public transport, public utilities and so forth. However, the central Federal or Commonwealth Government controls the major sources of funds through direct taxation revenue and loan raising, and transfers these to the states to fund their functional expenditure activities. Thus, whilst the States appear to have responsibility for the determination of expenditure priorities and day-to-day policy determination, they do not have the financial resources to back these up (or to 'go it alone'). On the other hand, whilst generally controlling the 'purse-strings' the Federal Government is reliant upon complementary State legislation and policy to ensure that national policy priorities and access is maintained.

Table 5.6: Relative Significance of the Social Wage by Equivalent Disposable Income Decile, Percentage of Disposable Income: 1981-82 to 1989-90

Decile	81-82	82-83	83-84	84-85	85-86	86-87	87-88	88-89	89-90
Health									
1	24.3	21.8	23.7	27.3	27.1	27.7	27.6	27.8	26.8
2	35.7	31.3	31.6	36.4	39.1	37.8	37.8	40.3	39.8
3	27.1	28.1	30.8	33.1	32.0	33.4	34.2	32.0	30.6
4	15.2	17.5	19.9	22.6	21.9	22.9	22.7	22.4	21.3
5	10.0	10.5	12.0	13.8	13.2	13.5	13.7	14.0	13.2
6	6.8	7.2	8.0	9.4	8.9	9.5	9.3	8.8	8.7
7	5.3	5.3	5.9	6.7	6.7	6.9	6.6	6.9	6.6
8	4.4	4.5	4.9	5.6	5.4	5.6	5.5	5.4	5.3
9	3.8	3.6	4.0	4.5	4.4	4.5	4.5	4.5	4.4
10	2.7	2.7	2.9	3.3	3.4	3.5	3.2	3.2	3.2
Education									
1	18.4	19.4	21.0	20.8	20.8	21.8	20.3	17.7	16.0
2	2.6	4.8	4.8	4.6	3.6	4.3	3.8	3.4	2.9
3	5.1	3.9	4.0	4.4	4.6	4.0	4.2	4.6	4.5
4	7.1	6.7	6.4	6.1	6.6	6.3	6.0	6.1	6.2
5	7.1	6.7	7.0	7.3	7.4	7.1	6.9	7.1	6.8
6	4.8	5.4	5.5	5.7	5.7	5.6	5.2	4.9	4.7
7	3.6	3.6	4.1	4.1	3.7	3.7	3.6	3.3	3.4
8	2.1	2.4	2.2	2.1	1.9	2.1	2.0	1.9	1.8
9	1.0	1.0	1.1	1.0	0.9	0.9	0.9	1.0	0.8
10	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.4
Social Wage									
1	42.7	41.2	44.7	48.1	47.9	49.5	47.9	45.5	42.8
2	38.3	36.1	36.4	41.0	42.7	42.1	41.6	43.7	42.7
3	32.2	31.9	34.8	37.5	36.6	37.4	38.4	36.6	35.1
4	26.7	24.2	26.2	28.7	28.5	29.2	28.7	28.5	27.5
5	17.1	17.2	19.0	21.1	20.6	20.6	20.6	21.1	20.0
6	11.5	12.6	13.5	15.1	14.6	15.1	14.5	13.7	13.4
7	8.9	8.9	10.0	10.8	10.4	10.6	10.2	10.2	10.0
8	6.5	6.9	7.1	7.7	7.3	7.7	7.5	7.3	7.1
9	4.8	4.7	5.1	5.5	5.3	5.4	5.4	5.5	5.2
10	3.1	3.1	3.3	3.7	3.8	3.9	3.6	3.7	3.6

One way in which the Federal Government has sought to increase its degree of direct policy intervention has been by use of tied specific purpose grants and agreements in contrast to general revenue assistance grants.

However, conversely through adoption of 'user-pay' principles and other revenue sources, State and local governments have sought to make themselves less financially dependent upon the Federal Government. Thus, to a certain extent, these other levels of government are also able, through their own financial resources, to influence the amount of total public sector government expenditure provided in different functional areas.

Thus, in examining the social wage expenditure in particular, it is important to separate, where possible, the changes in allocation attendant upon these Commonwealth/State financial arrangements and inter-governmental priorities. The principal mechanism by which the Federal Government can influence the social wage is through the Commonwealth Budget both in terms of direct expenditure itself (by-passing the States) or less directly through the provision of specific purpose grants, or indirectly through general revenue assistance. And whilst the States may be considered in general to provide the direct expenditure on the social wage elements the extent to which this occurs in practice varies both between years and between functional forms of such social wage expenditure. The more universal is the provision required by the Federal Government, that is, the more desirable it is that national minimum standards of access be applied (or the more 'necessary' the expenditure is considered) the more likely it is that the Federal Government will seek more direct involvement. On the cash-money side this is reflected in the virtually entirely national direct provision of social security. Similarly, with the introduction of the Medicare levy, health expenditure has become more directly under Federal Government direct or less direct control. For other forms of what could be broadly defined as the social wage this Federal Government contribution (including specific purpose payments) tends to be less.

For the two elements of the social wage that we consider here, health and school education, Table 5.7 outlines the total public sector expenditure on each item (sourced from ABS public finance data, see Appendix One) and that proportion of the total financed explicitly via the Commonwealth Budget (sourced from the Budget Papers). The residual difference can be attributed to internally-generated or self-funded expenditure by the States and local government (with the State level being the overwhelmingly dominant sub-sector). This latter source also includes general revenue assistance. The first point to note from Table 5.7 is that over the period, it was the non-budget 'other' expenditure which was the predominant source for social wage expenditure. In 1981-82, not only did predominantly State-sourced funds on school education and health separately each approximate the entire Budget contribution on both, but in total 'other' expenditure provided two-thirds of the entire public sector social wage expenditure.

However, over the period, the contribution of the Budget sector increased such that by 1989-90, it exceeded the social wage expenditure by the States. This occurred primarily as a result of the dramatic expansion on health spending at the Federal level, largely in consequence of the introduction of the Medicare levy.

From 1981-82 to 1989-90, federally such health expenditure increased three-fold whereas state expenditure only increased by 70 per cent. Similarly, education expenditure on schools in the Federal Budget increased at a greater rate than at the State level, largely in the earliest years of the period. In total, Federal social wage spending through the Budget increased by over 250 per cent in nominal terms or over 90 per cent in real terms, whereas State and other expenditure on the social wage increased by only 75 per cent or a cut of 5 per cent in real terms. Moreover,

Table 5.7: Social Wage Expenditure by Level of Government ($m): 1981-82 to 1989-90

	Budget			Other			Public Sector		
Year	Health	Education	Total	Health	Education	Total	Health	Education	Total
1981-82	2908	1155	4063	4048	4071	8119	6956	5226	12182
1982-83	3425	1389	4814	4271	4472	8743	7696	5861	13557
1983-84	4411	1552	5963	4818	4998	9816	9229	6550	15779
1984-85	6136	1729	7865	5206	5387	10593	11342	7116	18458
1985-86	6679	1870	8549	5852	5921	11773	12531	7791	20322
1986-87	7515	1942	9457	6479	6285	12764	13994	8227	22221
1987-88	8151	2180	10331	7200	6403	13603	15351	8583	23934
1988-89	10788	2409	13197	6309	7076	13385	17097	9485	26582
1989-90	11925	2470	14395	6795	7448	14243	18720	9918	28638

Source: See Table 5.1 above and Appendix One.

the changing relative impact of Budget-sourced social wage expenditure and its distribution vis-à-vis other governments is not merely due to this quantum change but the changing composition between health and education as highlighted in Table 5.8. This table shows the contribution of total health and education spending in the public sector by level of government.

Within the health expenditure, the Budget contribution increased from 42 per cent in 1981-82 to 64 per cent in 1989-90 with a concomitant fall in the 'other' sector spending. This occurred largely from dramatic increases in 1984-85 and 1988-89 in particular. On the other hand, with the exception of an increase of 1.6 per cent in the relative contribution in 1982-83, the contribution of the Budget to total school education finance has remained relatively unchanged (or perhaps better described as a gradual marginal increase) since that year. Slight discrete 'jumps' in Commonwealth contribution occurred in 1984-85 and 1987-88. The combination of these two influences is seen in the final columns of Table 5.8 which show that from one-third of the social wage expenditure being financed by the Budget in 1981-82, just over one-half was so funded in 1989-90.

More particularly, the Budget component of the total social wage expenditure became more health-biased in that in 1981-82, health expenditure comprised 62 per cent of the Budget total but in 1989-90 this had risen to over 82 per cent. Conversely, for State governments, except for a period between 1986 and 1988, education spending always exceeded health spending, and as a proportion of the total social wage expenditure, marginally increased from just over 50 per cent in 1981-82 to 52.3 per cent in 1989-90.

Whilst, given the methodology adopted for the allocation of health and education, the distribution of each component of the social wage is the same irrespective of the

Table 5.8: Contribution to Social Wage Expenditure by Level of Government, Percentages: 1981-82 to 1989-90

	Health		Education		Social Wage	
Year	Budget	Other	Budget	Other	Budget	Other
1981-82	41.8	58.2	22.1	77.9	33.4	66.6
1982-83	44.5	55.5	23.7	76.3	35.5	64.5
1983-84	47.8	52.2	23.7	76.3	37.8	62.2
1984-85	54.1	45.9	24.3	75.7	42.6	57.4
1985-86	53.3	46.7	24.0	76.0	42.1	57.9
1986-87	53.7	46.3	23.6	76.4	42.6	57.4
1987-88	53.1	46.9	25.4	74.6	43.2	56.8
1988-89	63.1	36.9	25.4	74.6	49.6	50.4
1989-90	63.7	36.3	24.9	75.1	50.3	49.7

Source: See Table 5.8 and Appendix One.

level of government it is financed from, reference above to the differential distribution by cash-income decile of these two components means that changes in their relative composition will affect the overall distribution of the social wage at each level of government. Ceteris paribus, we would expect the distribution of social wage from the Budget to become more directed to lower-income deciles relative to the distribution of expenditure from other non-Budget sources.

5.7 Conclusion

In this chapter, we have looked at expanding the 'cash-only' income concept of the earlier chapters to encompass the provision of government services in-kind through the concept of the social wage, which we have operationally defined as expenditure on health and school education. Expenditure on these components when added to government cash payments through social security more closely approximate total government revenue raised by direct income tax including the Medicare Levy. As such, the circular flow of income including these aspects of the public or government sector becomes more of a closed system, as government raises funds from private or market determined income sources and through a combination of cash and in-kind payments transfers it back to income units depending on their demographic and economic situation. That is, it effectively redistributes that private income. Together the two payments by government provide nearly one-third of cash income received as disposable income.

On an unadjusted income basis much of this social wage expenditure, allocated by age for health and number of school-aged children for education, appeared to be redistributed to income units in the higher disposable income deciles. However, when recognition of the differential needs of such income units is made by virtue of

their size and composition through the use of equivalence scales then it becomes clear that health expenditure in particular is directed to lower-income units when ranked by equivalent disposable income. With the exception of the first decile (reflecting the location of sole parent families in the overall distribution of cash-only income), education expenditure on schools is almost normally distributed with peaks in the fourth and fifth deciles.

The conclusion reached is that the social wage expenditure is particularly significant to the living standards of income units with low relative cash-income, and in consequence, its incorporation into a broader definition of income is likely to alter the overall distribution of well-being observed. The extent of this is the topic to be examined in the next section.

6 Impact of The Social Wage

Whilst the distribution of the social wage itself is of interest, our concern in this chapter is with the impact such expenditure has on the distribution of cash-only well-being and the changes annually in the distribution of 'final' income including the social wage.

6.1 Final Income Distribution

Overall Results

Table 6.1 reproduces the data from the simulation for all four of the concepts of income utilised: private, gross, disposable and now 'final' income. Two versions of this final income are presented. The first incorporates all social wage expenditure by the public sector on health and school education. The second incorporates only that expenditure that emanates from the Commonwealth Budget. As Section 5 indicated, this is composed of a higher proportion of health compared to education expenditure reflecting differing Commonwealth-State financial responsibilities. In the discussion that follows, our primary emphasis is on the former version, that is 'final' income incorporating all spending by government (at all levels) on health and education. This is designated as final (F). As for the previous analysis all data relates to the population of income units excluding self-employed.

Figure 6.1 diagrammatically overlays the resultant pattern of calculated Gini coefficients across the period of analysis on those of the other cash-based concepts, outlined in Figure 3.1. For the purposes of presentation, the initial value of the left-hand scale measuring the Gini coefficient differs for each income concept, although the relative scale reflecting changes is the same. Thus, for final income (F) the left-hand scale ranges from .260 to .290; and for disposable income from .310 to .340.

Accordingly, as Table 6.1 shows, the actual difference in the Gini coefficient between the concepts is the difference revealed visually from Figure 6.1 **plus** the fixed scale difference. Thus, the 'impact' of the social wage expenditure by all levels of government is reflected in the difference between 'disposable' and 'final (F)' (plus, of course the fixed value scale difference). Again this is done to emphasise significant movements which would be hidden utilising a completely comparative ordinal scale.

Consequently the first point to note from Figure 6.1 is that the addition of social wage expenditure reduces apparent inequality as measured by the Gini coefficient for equivalent final income compared to equivalent cash-only disposable income. Further, reflecting the larger expenditure involved on both health and education, the final income incorporating all public sector spending has a greater impact than that merely reflecting Commonwealth budgetary expenditure allocations.

Table 6.1: Distribution of Equivalent Income, All Income Concepts, Gini Coefficients: 1981-82 to 1989-90

Year	Private	Gross	Disposable	Final (Budget)	Final (F) (Public Sector)
1981-82	.487	.370	.316	.297	.272
1982-83	.505	.376	.323	.303	.279
1983-84	.509	.375	.319	.297	.274
1984-85	.509	.372	.315	.288	.266
1985-86	.504	.373	.314	.288	.265
1986-87	.509	.377	.316	.290	.267
1987-88	.508	.375	.328	.301	.278
1988-89	.502	.373	.331	.301	.282
1989-90	.501	.372	.324	.295	.276

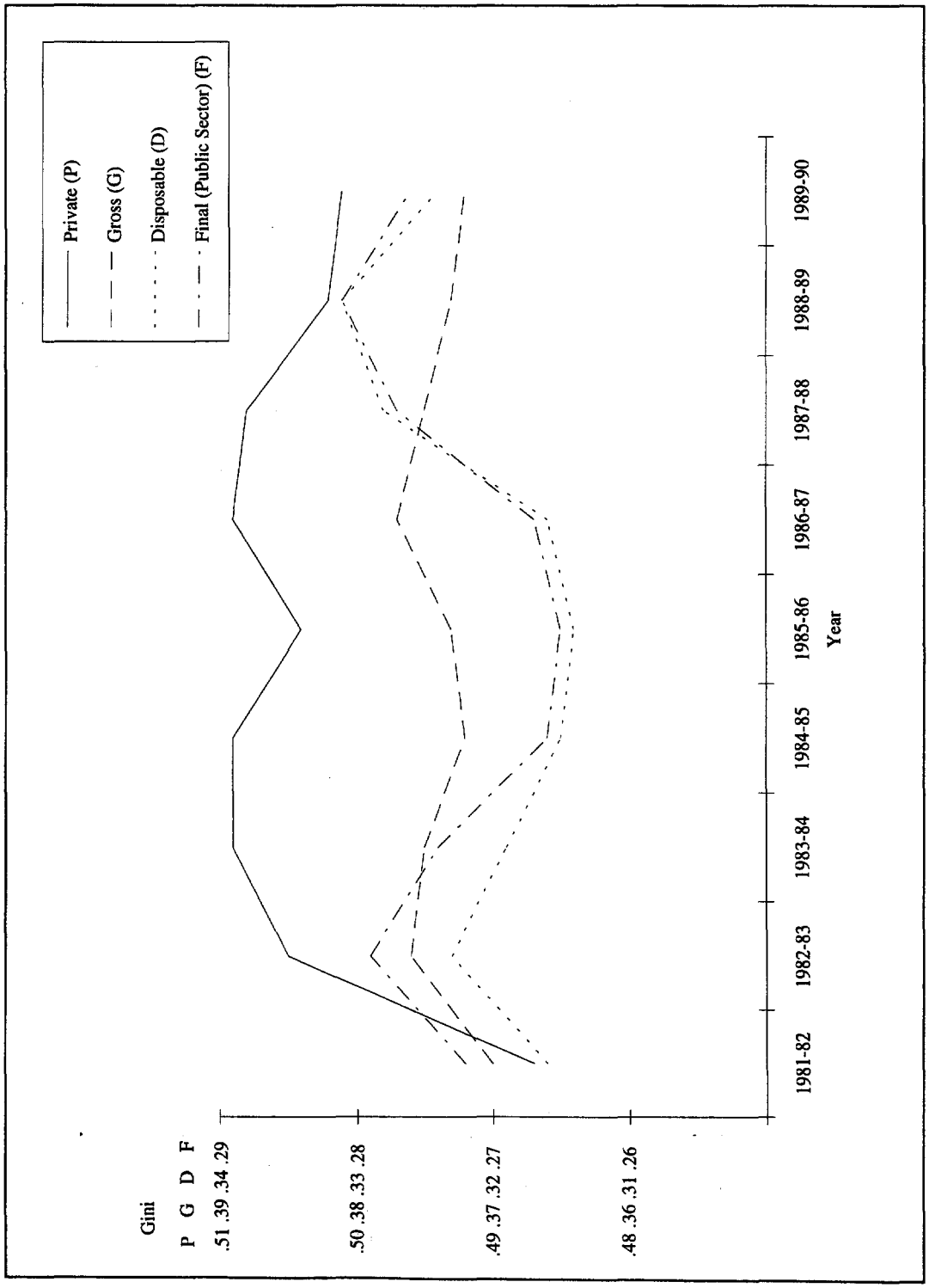
In addition to the points made in the earlier analysis of cash-income concepts, examination of Table 6.1 and Figure 6.1 reveals several additional points:

- the maintenance of the revealed wave-like pattern even with the addition of the social wage elements. Inequality in final income peaked in 1982-83 and again in 1988-89. Between those points, it followed an almost perfect U-shape;
- these peaks are noticeably higher in both 1982-83 and 1988-89 at the final income inequality level than at the cash-based disposable income inequality level, particularly in 1982-83. In consequence, the slight upward trend evident at the disposable level disappears at the final income level;
- the close link between the pattern of movement at the final income level and the disposable income level, reflecting the link between government taxes (on personal income) and government spending on the social wage;
- related to this, though, it is notable in the period from 1982-83 to 1984-85 that the decline in final inequality exceeded the decline in disposable income inequality, reflecting an increased impact of social wage expenditure in both 1983-84 and 1984-85; and
- the increased apparent significance of the social wage expenditure as a redistributive mechanism to reduce inequality, as indicated by the change in relative values and direction of inequality under each income concept.

In looking at the particular annual data year-by-year, the following points are made:

- in 1982-83, whilst the social security system was the primary force in reducing the apparent surge in private inequality, the social wage expenditure followed taxation in mitigating the rise;

Figure 6.1: Income Distributions: 1981-82 to 1989-90



- in 1983-84, the addition of the social wage expenditure increased the rate of decline in cash-income inequality, led by the social security system;
- in 1984-85, this movement of decline in final income continued with the social wage expenditure changes becoming the dominant contributor;
- in 1985-86, the inequality 'trough' of the decade was reached, again substantially through the contribution of social wage expenditure, in conjunction with the taxation system, although changes to social security acted to mitigate the private inequality decline;
- in 1986-87, as private inequality began to increase, it was at the final income level that the increase was least where the taxation, and further the social wage expenditure mitigated the rise at the gross income level,
- in 1987-88, in consequence of changes in taxation (discussed earlier in Sections 3 and 4), disposable income inequality rose, and this was carried through to the final income increase, although the social wage expenditure marginally mitigated the rate of increase;
- in 1988-89, whilst inequality continued to increase at the disposable income level, possible concerns about the level of government spending and its impact on the deficit, saw the social wage changes exacerbate this post-tax cash inequality increase; and
- in 1989-90, the reduction in inequality at the disposable income level, largely brought about by changes in the tax system, were matched by consequent changes at the level of final income.

Overall, whilst changes in final income inequality matched the direction and generally the magnitude of change in disposable income inequality, the years between 1982-83 and 1984-85 stand out as the period in which the social wage expenditure became a dominant factor in further reducing the levels of inequality following the 1982-83 recession. This pattern of change, and inferred contribution of the social wage, is borne out in Table 6.2 which, analogously to Table 3.2, presents the component contribution to the **change** in inequality each year from the previous year's level in the **absolute** value of the final income Gini coefficient for each income concept and implied component of government activity.

Table 6.2 highlights the strong contribution of the social wage in decreasing the level of inequality in 1984-85. In most other years, reflecting its link to government taxation receipts it was either neutral in its impact (0) or acted to further reduce final inequality from the disposable income level. However, in the last two years of the period of analysis, with increased concern about the level of government spending, changes in allocation served to increase the level of inequality. In 1988-89, this exacerbated the impact of the cash-transfer system (the net impact of social security and personal income tax) and in 1989-90 reduced the decline in consequence of those cash elements of government redistribution.

Table 6.2: Absolute Contribution of Government Taxes, Transfers and Social Wage to Change in Disposable Income, Gini Coefficients x 1000: 1982-83 to 1989-90

	Private	Cash[a] Transfer	Disposable	Non-cash[b] (Social Wage) Transfer	Final (F)
1982-83	+18	-11	+7	0	+7
1983-84	+4	-8	-4	-1	-5
1984-85	0	-4	-4	-4	-8
1985-86	-5	+4	-1	0	-1
1986-87	+5	-3	+2	0	+2
1987-88	-1	+13	+12	-2	+10
1988-89	-6	+9	+3	+1	+4
1989-90	-1	-6	-7	+2	-5

Note: a) Cash transfer refers to net impact of social security and personal income tax.
b) Non-cash transfer refers to impact of social wage allocation by total public sector on health and school education.

Source: Derived from Table 6.1.

Levels of Government Spending

Looking more specifically at the relative changes in final inequality by level of government spending, Figure 6.2 details the pattern of inequality, (again as measured by the Gini) for disposable cash-income and the two 'final' income versions. Final (P) represents the calculated Gini on a ranking based on equivalent income incorporating the total public sector allocation of health and school expenditure, and final (B) the Gini coefficient relating to the equivalent concept of income incorporating only the allocations of health and school expenditure in the Commonwealth Budget each year.

Because health expenditure is allocated on the basis of age-related utilisation rates taken from EPAC (1987) and the elderly (who have high rates of usage of the health system) are more concentrated in the lower deciles, health expenditure is far more vertically redistributive than education expenditure as shown in the previous chapter. Education (school) expenditure is allocated on a per capita school-age child basis and thus has no explicit or implicit income relationship.

Figure 6.3 outlines the change in equivalent income share by decile due to health and school education respectively, as the components of the social wage. Reflecting the outcome of the incidence analysis in the previous section and the location of specific income units defined by age (for health) or by presence and number of children (for education), health expenditure tends to have a much greater redistributive impact, compared to education expenditure.

Figure 6.2: Impact of Government Taxes and Transfers on Income Distributions by Level of Government: 1981-82 to 1989-90

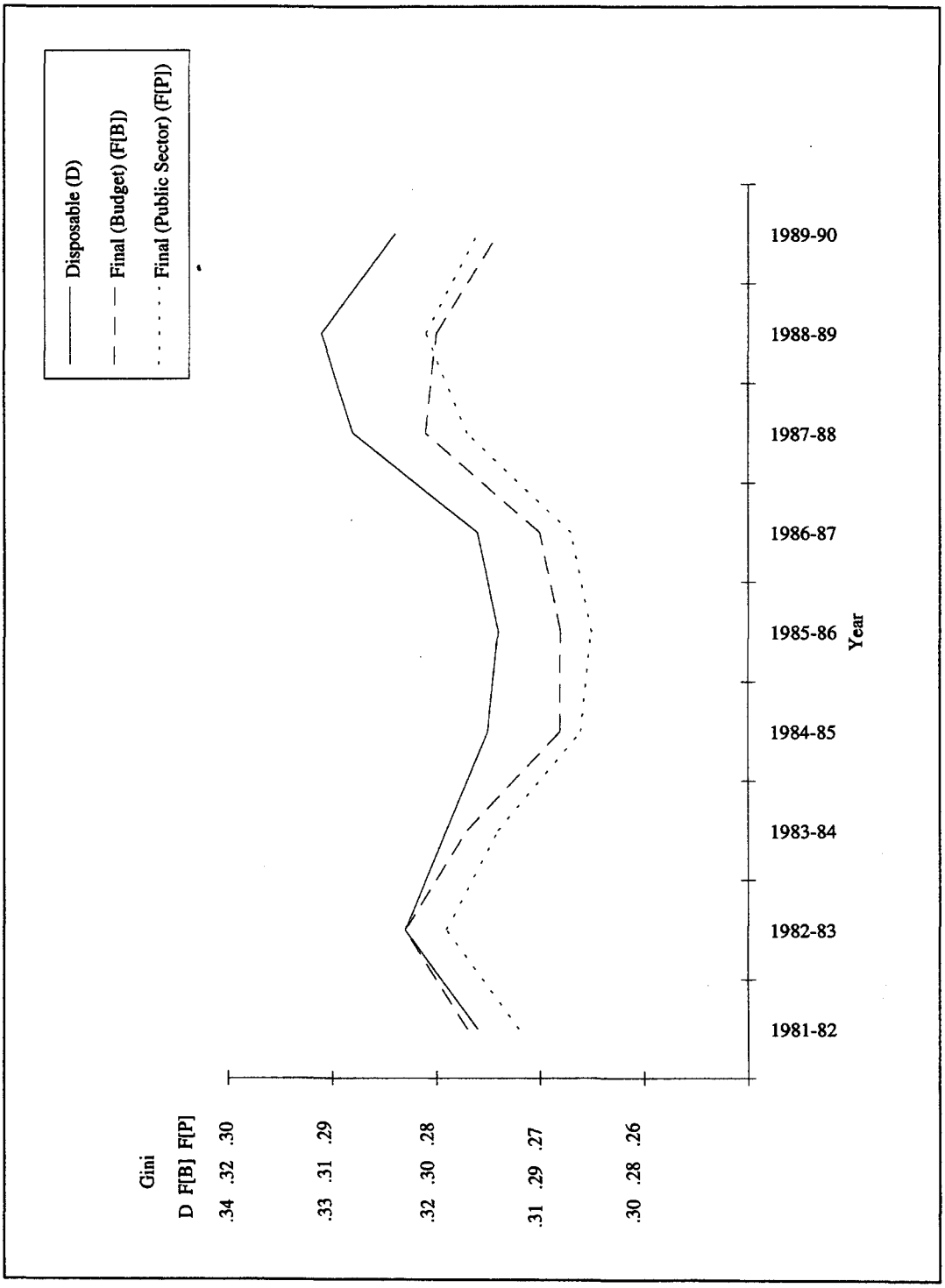
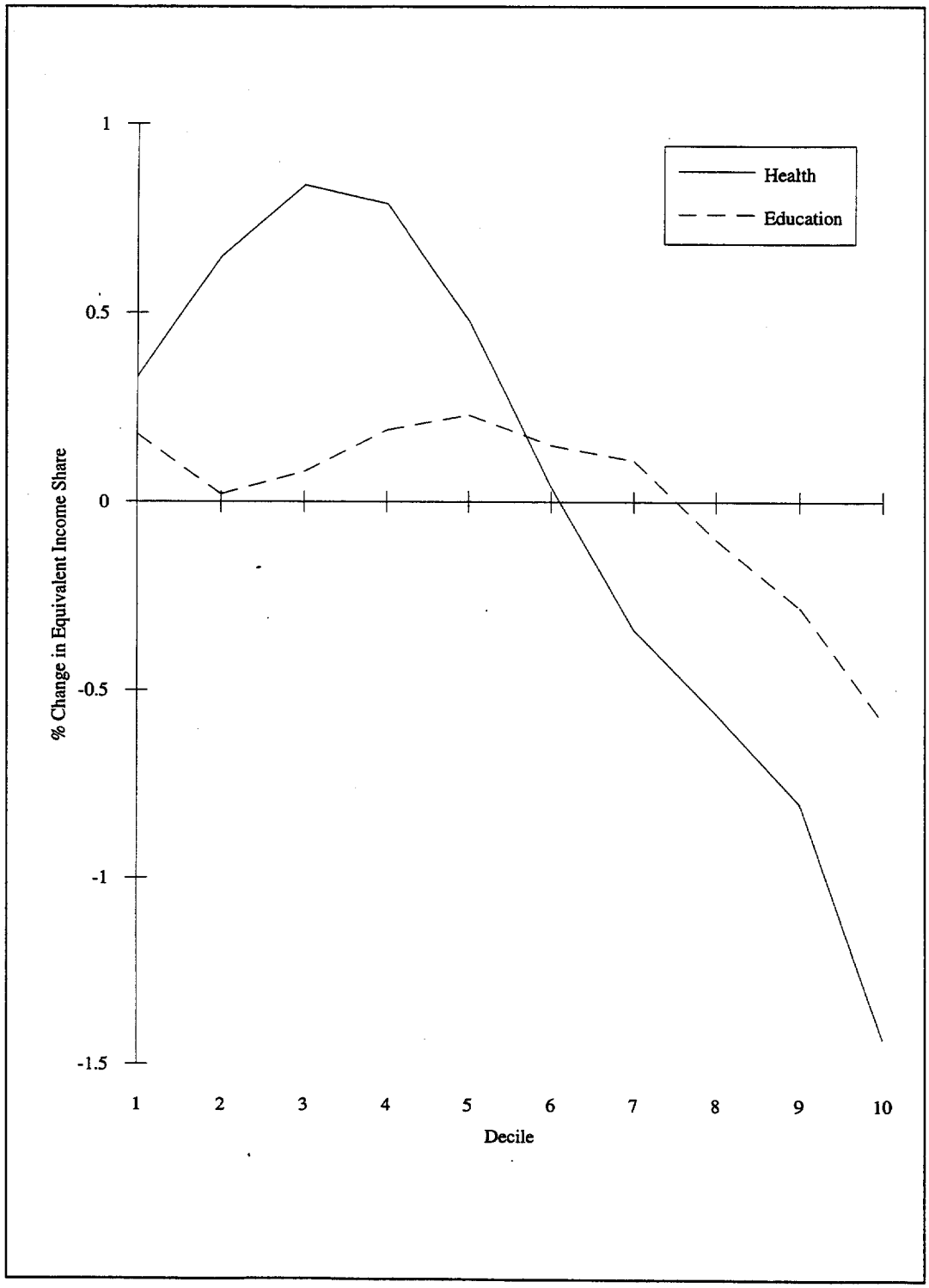


Figure 6.3: Distributional Impact of Social Wage Components: 1989-90



In part consequence of the greater redistributive capacity of health, the reduction in the Gini coefficient following the allocation of social wage expenditure financed by the Commonwealth Budget increased over the decade at a rate greater than for the social wage over the entire public sector. As discussed in the previous chapter, this stems from the division of expenditure responsibilities amongst various tiers of government in our federal system. In 1981-82, 42 per cent of the far more redistributive health expenditure was financed from the Budget, compared to only 22 per cent of the less redistributive education expenditure. By 1989-90, 64 per cent of health expenditure (which grew substantially faster) was financed from Commonwealth sources, compared to only 25 per cent of education expenditure. A greater proportion of Commonwealth social wage expenditure was on the more redistributive health care.

Accordingly, the Commonwealth Budget as a social wage redistributive device became far more significant over the 1980s. Conversely, the redistributive impact of State government spending on health and education reduced over the decade as firstly, State government social wage spending became more composed of education spending (53/47 split in 1989-90 compared to 50/50 in 1981-82) and secondly, the growth of State government social wage spending was lower than the Commonwealth increase (80 per cent increase over the decade, compared to the Commonwealth increased social wage spending of 250 per cent). This is confirmed by Table 6.3 which outlines the relative contribution to the change in the Gini coefficient of inequality at the final (all public sector) level of the Commonwealth Budget sector and, by inference from the difference, the Other Government sector (largely State government) spending on health and school education.

There are two critical junctures highlighted in Table 6.3. The first is between 1983-84 and 1984-85 where the Commonwealth Budget impact increased dramatically with the health expenditure consequences contingent upon the introduction of the Medicare levy. With little change in Other Governments' spending, the overall impact of the social wage increased.

The second notable point is at the end years of the decade, where in 1988-89 a further increase in Commonwealth Government spending saw the impact of that expenditure reduce final (Budget) level of inequality by a further .004 (31 less 27 divided by 1000). Unlike the previous situation, here the 'Other Government' sector was not able to either maintain its level of social wage expenditure or its allocation between health and education was such as to dramatically reduce its contribution to the reduction in final (Public Sector) inequality. Examination of the quantum expenditure data would suggest the former (see Section 5). Reference to the 1988-89 Budget Papers indicates a cut in general revenue grants to the States from the Commonwealth of 12.6 per cent (Commonwealth of Australia, Budget Paper No. 1, Statement No. 9, 1988-89: 290). To quote Statement No. 9:

Table 6.3: Relative Contribution of Commonwealth and 'Other' Government Spending to Inequality Reduction, Gini Coefficients x 1000: 1981-82 to 1989-90

	Budget	Other	Total
1981-82	19	25	44
1982-83	20	26	46
1983-84	22	23	45
1984-85	27	22	49
1985-86	26	23	49
1986-87	26	23	49
1987-88	27	24	51
1988-89	31	19	50
1989-90	30	18	48

> In order to restrain public consumption spending, the forward estimate of general revenue grants and Medicare compensation grants to the states for 1988-89 was cut by $650m. (Budget Paper No. 1, 1988-89: 281)

In response, the States cut their own self-funded expenditure on health, with the outcome indicated in Table 6.3 and Figure 6.2.

6.2 Inequality by Decile Shares of Final Income

In Table 6.4, the simulation results for final income (including the social wage) for each defined income unit type is tracked over the decade. This table shows that the general pattern, where inequality bottomed in the middle of the decade, applies to most types of income units. The exception to this is young single person income units which recorded the lowest Gini index in 1981-82 and 1988-89, both periods of relatively high levels of employment.

Whilst the pattern of inequality amongst each income unit type shows subtle differences, it should be noted that the pattern in the latter part of the decade becomes far more divergent. That is, the direction of change on an annual basis became less consistent between income unit types. This reflects the significance of dividend imputation as a causal factor in increased overall inequality (see Section 4). The impact of this measure (predominantly affecting high income earners) differed greatly amongst income unit types depending on the significance of such high income earners in each type.

In order to ascertain the impact of the social wage on inequality for each income unit type, Table 6.5 presents the calculated contribution of social wage to each type by the proportional reduction in the Gini coefficient when the social wage expenditure is incorporated. By definition, for all income unit types except couples with children

Table 6.4: Inequality Changes by Income Unit Types, Final Unadjusted Income (Including Social Wage), Gini Coefficients: 1981-82 to 1989-90

	1981-82 to 1989-90							
Year	Single <25	Single 25-64	Single 65+	Couple no children <65	Couple no children 65+	Couple with children	Sole parent	Overall unadjusted
1981-82	.271	.299	.187	.258	.204	.197	.276	.350
1982-83	.288	.307	.187	.265	.206	.203	.276	.355
1983-84	.285	.301	.181	.262	.199	.199	.270	.350
1984-85	.281	.294	.177	.255	.194	.193	.263	.341
1985-86	.276	.289	.184	.252	.201	.192	.261	.340
1986-87	.278	.289	.185	.254	.203	.198	.260	.343
1987-88	.278	.306	.186	.269	.206	.213	.260	.354
1988-89	.271	.305	.191	.275	.211	.218	.258	.360
1989-90	.277	.305	.188	.264	.214	.208	.259	.351

Table 6.5: Contribution of Social Wage to Change in Inequality (Change in Gini Coefficients with Social Wage Divided by Gini Coefficients of Disposable Income), by Income Unit Type, Percentages: 1981-82 to 1989-90

Year	Single <25	Single 25-64	Single 65+	Couple no children <65	Couple no children 65+	Couple with children	Sole parent	Overall unadjusted
1981-82	3.9	5.1	17.3	6.9	17.4	10.0	11.5	4.9
1982-83	3.7	5.0	17.3	6.7	16.9	11.0	11.5	4.8
1983-84	4.0	5.3	17.4	7.1	17.4	11.2	11.5	5.2
1984-85	4.4	6.1	16.9	8.3	17.8	11.9	10.9	5.5
1985-86	4.2	5.9	17.9	8.4	18.3	11.9	11.2	5.6
1986-87	4.5	6.2	18.5	8.3	18.8	12.4	11.0	6.0
1987-88	5.2	5.9	18.1	7.9	18.6	12.7	11.0	6.1
1988-89	4.6	5.9	18.7	7.7	19.2	12.5	10.4	6.3
1989-90	4.5	5.9	18.8	7.7	18.9	12.0	10.7	6.1

and sole parents, the social wage allocation refers solely to health spending. As anticipated, the significance of this health spending is greatest for the elderly. In general, the contribution of this social wage increased over the period both overall and for each income unit. The exception to this relates to sole parents for whom it fell slightly. This probably reflects the significance of more volatile changes in labour market and social security provision affecting the original (that is, disposable income) inequality.

In general, reflecting both the increase in the quantum amount of social wage expenditure and its composition between health and education, the redistributive

impact of the social wage (all public sector) increased over the period of analysis. However, from Table 6.5 it is apparent that the impact of the social wage not only differs in relative impact between income unit types, but the year in which the peak impact occurs differs also by income unit type. For young (under 25 years) single person income units this occurred in 1987-88 when the social wage (all public sector) allocation served to reduce the Gini coefficient at the disposable income level by 5.2 per cent. This was substantially in excess of the impact in 1982-83 where the proportionate redistributive impact was only 3.7 per cent. For middle-aged (25-64 years) single people, the peak impact occurred around the middle of the period of analysis, both just before and just after the inequality 'trough' in 1985-86. The impact of the social wage was substantially greater around the second 'peak' of final inequality in 1988-89 than around the first in 1981-82.

For the elderly, however, both as single person and couple income units the peak of inequality impact in the social wage occurred quite clearly at the end of the decade, peaking in 1989-90. The revealed impact pattern from Table 6.5 is generally one of consistent increase. This reflects the reliance of this group on health expenditure which was the major contributor, compared to education, to the social wage expenditure allocation increase in the period.

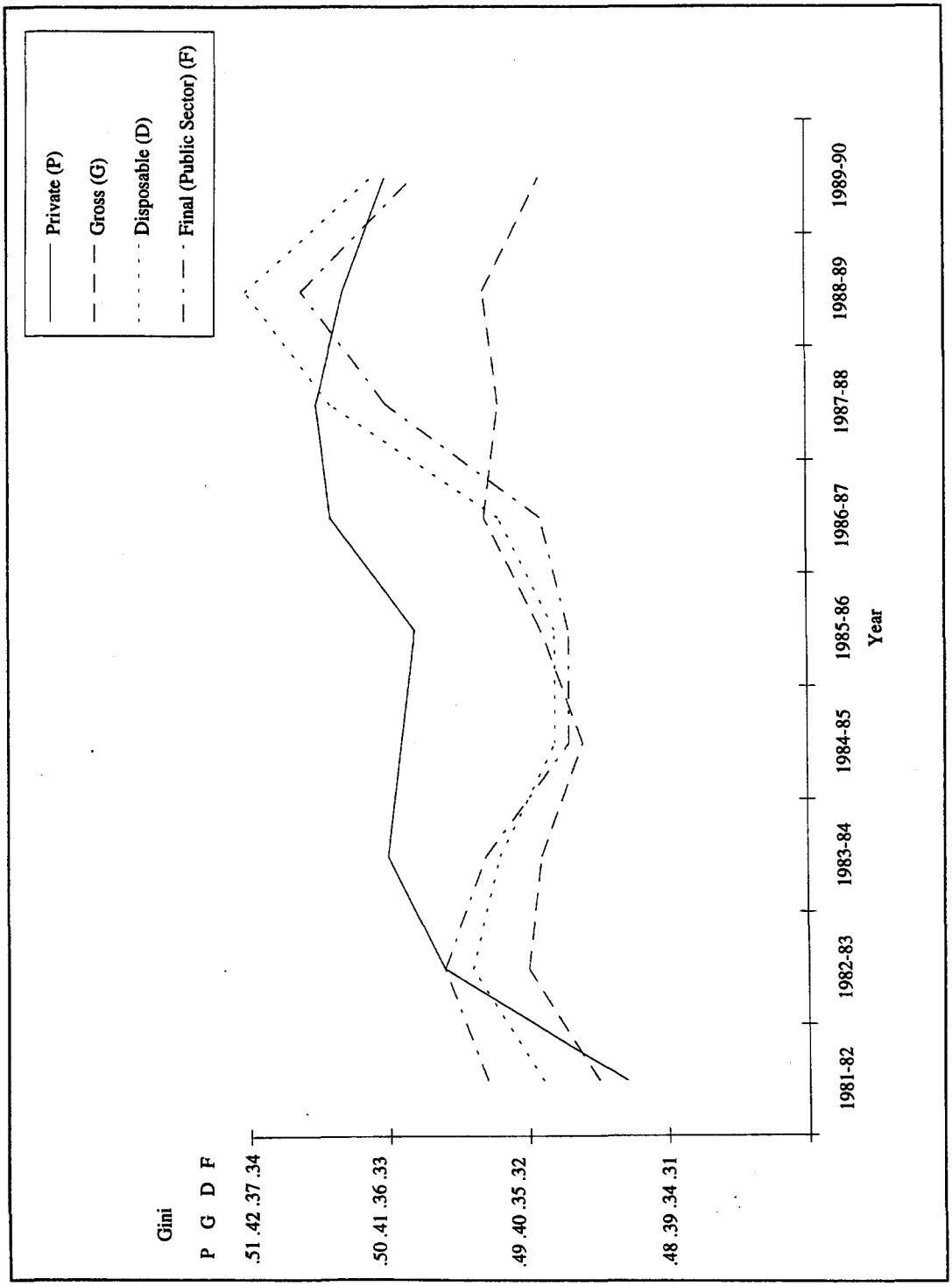
Whilst also reliant on school education allocations, couples with children exhibited a similar pattern to the elderly. That is, the impact of the combined allocations of health and school education increased consistently over the decade from a consequential 10 per cent reduction in disposable income inequality in 1981-82 to 12 per cent in 1989-90. However, here the peak occurred in 1987-88 at 12.7 per cent. For couples without children, though, the peak occurred in 1985-86, with the impact of the social wage being less in the earlier period and tapering off after this date.

Finally, for sole parents, the peak contribution of the social wage expenditure in reducing final inequality occurred at the beginning of the period of analysis, between 1981-82 and 1983-84, and subsequently became less until it reached a nadir in 1988-89.

The impact over time of the social wage on the distribution of disposable income is also demonstrated in Figure 6.4 which presents the results where **households** are taken as the unit of analysis (analogous to Figure 3.2).

In the earlier part of the period under analysis the social wage acted to mitigate the rise in cash-only inequality as measured by equivalent disposable income in 1981-82 and increase the reduction in this inequality in subsequent years to 1985-86. This is observed from the relative slopes of the disposable and final (including social wage) lines in Figure 6.2. From 1986-87 onwards, as disposable money income inequality increased dramatically, the social wage acted again to mitigate the increase, particularly in 1986-87, as reflected in the less severe slope of the final income inequality measure from that year. As adherence to objectives of deficit reduction took hold, the capacity of the social wage to continue this inequality-mitigating role was reduced somewhat and disposable and final inequality tended to move more in parallel.

Figure 6.4: Simulated Income Distributions (Including Contribution of Social Wage) by Households, Gini Coefficients: 1981-82 to 1989-90



Overall, Figure 6.4 demonstrates graphically that over the period of analysis, the addition of the social wage to the income concept being considered acted to reduce both the amplitude of the fluctuations in inequality and the extent of the apparent upward trend at the disposable income level.

6.3 Income Shares

Given the possible ambiguity in interpreting changes in the Gini coefficient, it is appropriate to examine both the distribution of final income and the impact of the social wage at the decile level. In Table 6.6, the simulation results of the shares of equivalent final income are presented (utilising the OECD equivalence scale). With the addition of the social wage the broad pattern of change over time by each decile group is not dramatically different from that revealed for equivalent disposable income (Table 3.4), maintaining the diversity of peaks and troughs. When we relate the two tables to examine the impact on income share of the social wage, the redistributive pattern becomes clear. Table 6.7 shows the change in decile income share attendant upon addition of the social wage thus indicating the redistribution pattern after its incorporation. The first point to note is that the beneficiaries of the largest increase in income share are consistently those income units in the third and fourth equivalent income deciles. The bottom six deciles all gain on a relative basis whilst the top four deciles lose share as a result of including the social wage.

A comparison of the outcome in 1989-90 with 1982-83 indicates that the social wage became more redistributive in the latter year, as the absolute magnitude of the decile gains and losses is larger. Comparing the impact on each decile over the period, the general trend apparent is one of increased change over time particularly from 1982-83. For the first decile the peak gain occurred in 1987-88 with a decline occurring from that point. However, for the second decile the largest gain occurs at the extremes of the period of analysis in 1982-82 and the final two years. The gain in share of the third decile was maximised in 1988-89 and 1985-86, whereas for the fourth and the fifth it occurred in 1987-88. For the four 'losing' deciles in relative terms, greatest change again occurred in the 1985-86 to 1986-87 period for the seventh to ninth equivalent income deciles. However, for the top (tenth) decile this occurred slightly later in both 1987-88 and 1988-89 where the 'loss' was 2.14 per cent.

6.4 Cross-Decile Movement

All of the analysis to date of the impact of the social wage has compared the change in the distribution of income units ranked prior to the addition of the social wage allocation to the distribution of units re-ranked after that allocation. However, whilst this may provide indication of the relative living standards of each aggregate decile of the distribution much like cutting and examining a horizontal slice of a cake, it tells us little about the extent of movement between deciles of particular income

Table 6.6: Simulated Equivalent Final Income Distribution by Decile Shares, Percentages: 1981-82 to 1989-90

	Year								
Decile	81-82	82-83	83-84	84-85	85-86	86-87	87-88	88-89	89-90
1	3.33	3.20	3.30	3.43	3.44	3.41	3.38	3.42	3.40
2	5.48	5.38	5.48	5.62	5.58	5.56	5.49	5.48	5.49
3	6.40	6.30	6.40	6.51	6.49	6.47	6.36	6.35	6.38
4	7.49	7.36	7.42	7.48	7.52	7.48	7.34	7.33	7.41
5	8.48	8.40	8.48	8.59	8.60	8.59	8.43	8.37	8.43
6	9.58	9.54	9.53	9.57	9.62	9.60	9.41	9.35	9.45
7	10.90	10.89	10.86	10.84	10.90	10.88	10.68	10.58	10.73
8	12.52	12.59	12.55	12.47	12.54	12.55	12.35	12.19	12.34
9	14.75	14.99	14.91	14.75	14.75	14.73	14.56	14.36	14.53
10	21.06	21.36	21.09	20.74	20.55	20.74	21.99	22.58	21.85
Bottom 20%	8.81	8.58	8.78	9.05	9.02	8.97	8.87	8.90	8.89
Bottom 40%	22.70	22.74	22.60	23.04	23.03	22.92	22.57	22.58	22.68
Bottom 50%	31.18	30.64	31.08	31.63	31.63	31.51	31.00	30.95	31.11
Gini	.272	.279	.274	.266	.265	.267	.278	.282	.276

Table 6.7: Change in Equivalent Income Decile Share With Addition of Social Wage: 1981-82 to 1989-90[a][b]

	Year								
Decile	81-82	82-83	83-84	84-85	85-86	86-87	87-88	88-89	89-90
1	0.53	0.50	0.53	0.56	0.56	0.58	0.56	0.54	0.51
2	0.70	0.63	0.60	0.62	0.65	0.61	0.62	0.67	0.67
3	0.92	0.87	0.87	0.91	0.95	0.93	0.93	0.95	0.92
4	0.87	0.88	0.93	0.97	1.01	1.01	1.02	1.00	0.98
5	0.45	0.54	0.71	0.80	0.75	0.80	0.81	0.77	0.71
6	0.08	0.15	0.20	0.26	0.20	0.21	0.20	0.21	0.19
7	-0.24	-0.20	-0.19	-0.20	-0.25	-0.22	-0.22	-0.23	-0.23
8	-0.59	-0.56	-0.59	-0.61	-0.66	-0.68	-0.67	-0.67	-0.66
9	-0.97	-0.99	-1.07	-1.18	-1.18	-1.18	-1.12	-1.07	-1.08
10	-1.77	-1.81	-1.93	-2.08	-2.01	-2.05	-2.14	-2.14	-2.01
Bottom 20%	1.23	1.13	1.13	1.18	1.21	1.19	1.18	1.21	1.18
Bottom 40%	3.02	2.88	2.93	3.06	3.17	3.13	3.13	3.16	3.08
Bottom 50%	3.47	3.42	3.64	3.86	3.92	3.93	3.94	3.93	3.79
Top 40%	-3.57	-3.56	-3.78	-4.07	-4.10	-4.13	-4.15	-4.11	-3.98
Top 20%	-2.76	-2.80	-3.00	-3.26	-3.19	-3.23	-3.26	-3.21	-3.09

Note: a) all values represent an increase unless preceded by a (-) sign.
b) the sum of the change in any one year may not equal zero, due to rounding.

units as a result of incorporating the social wage. One way of examining this aspect of the impact of broadening the income concept is to compare the cross-tabulated transition matrix of deciles of income units ranked by disposable equivalent money income and those units ranked by final equivalent income, as in Table 6.8.

Taking 1989-90 as the illustrative year, Table 6.8 shows the movement of income units from each decile of disposable money income to each decile of final income when the social wage is included. Thus, from that table, 76.7 per cent of income units who were in the first decile of the disposable equivalent income distribution are still in that bottom decile when units are re-ranked with the social wage allocation in the final equivalent income distribution. However, 17.9 per cent of those first decile disposable income units moved up to the second decile of final income and 3.7 per cent moved up to the third decile. For the remaining 1.6 per cent the impact of the social wage was such as to move them fully three deciles, up to the fourth decile of the final income distribution.

The outstanding feature of Table 6.8 is, in fact, the number of income units who do move. What is known as the 'trace' of the matrix, the diagonal that links each decile of disposable income with the corresponding decile of final income (first with first, second with second and so on), shows the proportion of income units in each decile that do not move in decile ranking when allocated the social wage expenditure. Thus, as we have seen 76.7 per cent of units in the first decile of disposable income remained in that decile at the final income level. However, further down the trace diagonal this percentage falls off rapidly. In the fifth decile of the trace only 28.9 per cent remain, the other 71.1 per cent of income units moved into another decile of relative ranking when the social wage was added. In this case, 49.9 per cent 'slipped' to a lower decile, either the fourth or third, because they received very little relative to other income units from the social wage expenditure we considered. This may have been because of their age in relation to health or because they had no children to benefit from the school education allocation.

From the second through to the sixth decile significantly less than half remained in their relative decile position. Towards the top end of the distribution, from the seventh decile up, such inter-decile movement was less. The two deciles of disposable equivalent income which showed greatest movement were the third and the fifth. It is little wonder then that it is this lower-middle segment of the distribution that exhibits the greatest relative change contingent upon the social wage.

The other notable point of Table 6.8 is the extent of the range of movement between deciles. 1.8 per cent of income units in the second decile of disposable income (or 0.18 per cent of all income units) moved upwards four deciles to the sixth decile of final equivalent income. On the other hand, no income unit 'fell back' in relative terms more than two deciles. More activity occurs on the segment of the matrix above and to the right of the trace diagonal than occurs in the bottom-left portion.

Table 6.8: Transition Matrix of Disposable and Final Income: 1989-90

Disposable Income Decile	Final Income Decile 1	2	3	4	5	6	7	8	9	10
1	76.7	17.9	3.7	1.6	-	-	-	-	-	-
2	21.3	35.7	20.7	5.3	15.2	1.8	-	-	-	-
3	2.0	36.6	32.4	13.0	9.8	6.2	-	-	-	-
4	-	9.9	34.0	36.7	8.2	8.9	2.3	-	-	-
5	-	-	9.1	40.8	28.9	15.1	6.0	0.3	-	-
6	-	-	-	2.7	37.9	39.8	16.5	3.1	-	-
7	-	-	-	-	-	28.1	54.3	15.9	1.6	-
8	-	-	-	-	-	-	20.8	68.2	10.9	0.2
9	-	-	-	-	-	-	-	12.6	82.5	4.8
10	-	-	-	-	-	-	-	-	5.1	94.9

Note: Totals may not exactly sum to 100.0 due to rounding.

Table 6.9 reproduces this cross-tabulation matrix for the 1982-83 reference year to enable comparison to be made over the period to 1989-90. Two points of comparison are noteworthy. Firstly, the extent of income units who remain on the trace diagonal (that is, do not move their relative decile ranking) is greater in 1982-83 than it was in 1989-90. In all except the third decile, the proportion moving was larger in 1989-90. As for 1989-90, the numbers remaining in the same decile in 1982-83 with the addition of the social wage are less than a half in all deciles from the second to the sixth. However, the lowest trace percentages were consolidated in the fourth and fifth deciles in the earlier year rather than the third and fifth, as in 1989-90.

The second point to note in comparison is that the extent of movement across deciles was less in 1982-83. Unlike 1989-90 no income units moved more than three deciles upwards, and far less moved even three deciles (less than 0.5 per cent in 1982-83 compared to nearly 3.0 per cent in 1989-90). Similarly far fewer moved even two deciles downwards in 1982-83 (less than 1 per cent) compared to the later year (nearly 2.5 per cent). The first decile of the final income distribution contains no income units from the third decile of disposable income in 1982-83, whereas in 1989-90, from Table 6.8, 2 per cent of that final decile where originally in the third disposable income decile.

This comparison confirms that the social wage mechanism had a much greater impact in changing inequality and relative living standards in 1989-90 compared to 1982-83, as indicated in earlier analysis. Moreover, both transition matrices confirm the significance and extent of impact of incorporating the social wage into a broader income concept.

Table 6.9: Transition Matrix of Disposable and Final Income: 1982-83

Disposable Income Decile	1	2	3	4	5	6	7	8	9	10
1	79.7	15.7	4.0	0.6	-	-	-	-	-	-
2	20.3	41.0	18.5	17.2	2.9	-	-	-	-	-
3	-	36.6	36.9	9.8	15.8	0.9	-	-	-	-
4	-	6.7	38.1	30.7	16.9	7.3	0.3	-	-	-
5	-	-	2.5	41.7	32.4	18.3	5.0	-	-	-
6	-	-	-	-	31.8	46.7	19.6	1.9	-	-
7	-	-	-	-	-	26.8	56.1	16.7	0.4	-
8	-	-	-	-	-	-	19.0	69.3	11.7	-
9	-	-	-	-	-	-	-	12.1	83.6	4.4
10	-	-	-	-	-	-	-	-	4.3	95.6

Note: Total may not exactly sum to 100.0 due to rounding.

Reflecting the health/education split, the increase in decile income share for Commonwealth Budget social wage expenditure has a consistent mode in the third decile whereas non-Budget (that is, State government) expenditure has a mode which has shifted over the decade from the fourth to the fifth decile, reflecting increased relative importance of education.

The data in Table 6.7 shows a clear-cut transfer from higher to lower income earners in consequence of the social wage expenditure. Moreover, this transfer from the top 40 per cent on an equivalent income basis to the bottom 60 per cent, increased consistently up to 1987-88, but declined in magnitude in 1988-89 and 1989-90, largely because of reduced State government expenditure impact.

6.5 Living Standards

Horizontal Inequality

As indicated earlier, the impact of the social wage expenditure on living standards depends not merely on the size of the expenditure on each area but the particular demographic characteristics of each income unit type.

The impact of non-cash income relative to the overall gain in income for all income units grouped by income unit type is shown in Table 6.10. Thus, at the disposable equivalent income level, in 1981-82, single person income units aged under 25 received 89 per cent of the average of all income units. Conversely, single people aged 25-64 received 26 per cent more than that average. On a cross-sectional basis, the elderly and sole parent income units all received less than 70 per cent of the mean average, whilst couples without children received in relative terms double these two groups and 40 per cent more than the overall average for all income units.

Table 6.10: Non-cash Social Wage Income as Percentage of Overall Mean Income by Income Unit Type: 1981-82 to 1989-90

Year	Single <25	Single 25-64	Single 65+	Couple without children <65	Couple without children 65+	Couple with children	Sole parent	Total
I Disposable								
1981-82	89	126	63	140	69	105	63	100
82-83	88	127	66	140	71	104	62	100
83-84	89	127	67	139	73	103	63	100
84-85	90	129	67	137	73	101	64	100
85-86	91	128	67	137	73	101	64	100
86-87	89	127	68	138	74	101	65	100
87-88	88	128	66	139	73	102	65	100
88-89	86	126	66	139	73	103	65	100
89-90	87	127	67	138	73	102	68	100
II Final								
1981-82	83	117	80	131	83	111	77	100
82-83	82	118	82	131	85	110	76	100
83-84	82	118	85	131	87	110	77	100
84-85	82	119	87	127	89	108	79	100
85-86	83	118	86	128	88	107	79	100
86-87	81	117	88	129	90	108	79	100
87-88	80	118	86	130	89	108	78	100
88-89	79	117	86	130	89	109	79	100
89-90	80	117	86	129	89	108	80	100
III Difference (II minus I)								
1981-82	-6	-9	+17	-9	+14	+6	+14	-
82-83	-7	-9	+17	-9	+14	+6	+14	-
83-84	-7	-9	+18	-8	+14	+7	+14	-
84-85	-8	-10	+20	-10	+16	+7	+14	-
85-86	-8	-10	+19	-9	+15	+6	+15	-
86-87	-8	-10	+20	-9	+16	+7	+14	-
87-88	-8	-10	+20	-9	+16	+7	+14	-
88-89	-7	-9	+20	-9	+16	+6	+14	-
89-90	-7	-10	+19	-8	+16	+6	+12	-

Over the course of the period of analysis as was noted in Section 3, the relative position of these lowest income groups - the elderly and sole parents - improved in cash-income terms at the disposable income level.

However, their relative impact was more dramatically affected by the inclusion of the social wage as an additional component in the final concept of income. The bottom segment (III) of Table 6.10 indicates the change in income relative to the overall equivalent mean by the addition of the social wage.

This table shows a consistent pattern, with non-cash social wage income improving the relative income positions of families with children and the elderly at the expense of single persons and couples without children. Among the gainers, the elderly and sole parents tend to gain most whilst middle-aged single people and childless couples tend to lose most in relative terms. The other point to note from Table 6.10 is that those who gain most from the social wage are those who need it most, based on relative equivalent disposable income - the elderly and sole parents.

The social wage, therefore, is extremely significant in ensuring greater horizontal equality. With the social wage, the difference between maximum relative income (131) and minimum (77) by family type drops to 54, compared to 77 at disposable income stage, 92 at gross income and 136 at private income stage. This horizontal redistribution was consistent over the decade with the period in the middle around 1985-86 providing the strongest redistribution.

The pattern of change over time at this final income level reflects the changes highlighted earlier at the disposable income level as well as the relative impact of social wage expenditure. In terms of overall horizontal inequality, as measured by the difference between the highest and lowest percentages for specific income units at the final income level, from Table 6.10 (segment II) this generally was lower at the end of the period than at the beginning. Inevitably this is a comparison between couples without children and sole parents, with the maximum difference (of 55) occurring in the recession of 1982-83 and the minimum difference (49) occurring in both 1985-86 (the overall 'trough' of inequality in the period) and in 1989-90. However, perusal of Table 6.10 indicates that this conclusion holds more generally when comparing the range of income unit types below the mean (sole parents and the elderly) to the range of types above the mean (couples and middle-aged singles). The exception is in respect of young singles (under 25 years of age) who in relative terms lost ground when compared to the overall mean and each other income unit type. In 1981-82, they received on average 83 per cent of final overall mean income but by 1989-90 this had fallen to 80 per cent. All other groups, with the exception of couples with children, gained in relation to relative mean income. This relative decline for the young was reasonably consistent over the period, but was exacerbated by the relative decline experienced in consequence of the social wage in the period from 1984-85 to 1987-88 (segment III, Table 6.10). This occurred because of the increase in social wage expenditure benefiting most of the other income unit type groups. Being single they received no school education component and being young, they received a smaller share of the health component (which is based on

age-related utilisation rates). It may be that if the operational social wage definition was expanded to include tertiary education that the results currently evident for these young singles would be different.

Short Run Change, 1982-83 to 1989-90

The social wage is therefore significant both in terms of vertical redistribution and horizontal redistribution. The question then becomes what significance has it had in improving living standards. Again, as in the cash income section we take the period of the Labor Government to 1989-90, compared to 1982-83.

Table 6.11 (analogous to Table 3.10) shows the annual change in real equivalent final income by decile and real unadjusted final income by income unit type. The results from Table 3.10 for disposable income are also reproduced.

Looking at final income, with the inclusion of the social wage, the gains now start to become considerable. Moreover, they are more evenly and consistently spread across the deciles. With the exception of the top tenth decile, there is a consistent pattern of increasing percentage real gains as we approach the bottom of the distribution (the first decile).

Amongst income unit types, two distinct sets emerge: the elderly and sole parents with an average increase of about 14 per cent; and the remainder with an increase averaging 6-7 per cent (about one-half). The smaller percentage increase for sole parents at the final income level compared to disposable income stems from the very large cash benefits received in the Family Package from a smaller base compared to the larger base from which final income changes were calculated (that is, it is largely a statistical artefact).

Perhaps the most critical column is the third which shows the difference between the increase in final and disposable real incomes. In particular, the fourth and fifth deciles, who lagged in terms of cash income living standard changes received the greatest additional boost as a result of the social wage. This group, the so-called working poor were critically reliant upon the social wage to maintain their relative living standards. This is an important result because it is this group which is likely, according to Saunders (1992b), to have been most affected by cash-income changes contingent upon unemployment and the recession since 1989-90. Their receipt of the social wage is in all probability even more critical to maintaining their living standards. Whilst the social wage gains were significant for the bottom half of the distribution, they were particularly so for the three deciles above the bottom quintile, which is heavily reliant upon social security.

However, as we observed earlier, short run changes can be misleading. The critical question becomes: does this pattern hold when we look at the cumulative change annually between 1982-83 and 1989-90?

Table 6.11: Changes in Real Final Income by Decile and Income Unit Type, Percentages: 1982-83 to 1989-90

Decile	(1) Final	(2) Disposable	(3) = (1)-(2)
1	15.4	14.8	0.6
2	10.8	8.8	2.0
3	10.1	7.7	2.4
4	9.3	6.4	2.9
5	8.8	5.2	3.6
6	7.5	5.8	1.8
7	7.0	5.9	1.0
8	6.4	6.0	0.4
9	5.2	4.6	0.6
10	11.0	11.3	0.7
Mean	8.6	7.2	1.4
Income Unit Type			
Single <25	6.9	6.1	0.8
Single 25-64	7.5	7.1	0.4
Single 65+	14.1	9.5	4.6
Couple without children <65	6.5	5.9	0.6
Couple without children 65+	14.1	10.5	3.6
Couple with children	6.3	6.2	0.1
Sole parent	14.1	16.6	-2.5

Cumulative Gains

As in the earlier section, cumulative gains are the mean annual increase in gains/losses each year over the period of analysis. Table 6.12 shows these cumulative gains obtained from our annual simulation - that is, the average annual change over the period from 1981-82 to 1989-90 in real equivalent final income by decile and real unadjusted final income by income unit type. Again, the previously presented results for disposable income are reproduced from Table 3.13.

Reflecting the fact that the gain made by the top decile, though large on an annual basis, occurred in the last three years of the period, the cumulative gains are more modest. Similarly, for couples with children, the large gains toward the end of the decade were countered by loses in real income at the beginning.

At the final income level, the more consistent redistributive pattern revealed by the year by year analysis appears to hold, particularly when the top decile can now be considered. A slight 'hiccup' to the proposition of increasing real percentage gains as we move toward the bottom of the distribution, occurs in respect of the fourth decile, which we have already highlighted as possibly vulnerable in the post 1989-90 period. The additional gains, attendant upon considering the social wage, are again concentrated in the bottom half of the distribution and principally in the fourth and fifth decile. Again, the conclusion holds that fourth and fifth deciles, whilst being particularly susceptible to movements in the cash-income transfers, are most reliant on the social wage to maintain their relative living standards.

Table 6.12: Cumulative Change in Real Final Income by Decile and Income Unit Type, Percentages: 1982-83 to 1989-90

Decile	(1) Final	(2) Disposable	(3) = (1)-(2)
1	11.5	9.2	2.3
2	7.9	6.4	1.5
3	7.1	4.5	2.6
4	5.9	2.6	3.3
5	6.2	1.7	4.5
6	4.7	2.3	2.4
7	4.0	2.5	1.5
8	3.6	2.8	0.8
9	2.6	1.9	0.7
10	4.9	4.2	0.7
Mean	5.0	3.2	1.7
Income Unit Type			
Single <25	4.5	3.7	0.8
Single 25-64	4.4	3.6	0.8
Single 65+	10.7	5.3	5.4
Couple without children <65	3.1	2.1	1.0
Couple without children 65+	10.2	5.6	4.6
Couple with children	3.3	1.6	1.7
Sole parent	8.4	7.8	0.6

6.6 Conclusion

The clear conclusion to emerge from this analysis of final income and in particular the impact of non-cash income in the form of social wage expenditure on health and school education is that it **matters.**

The social wage significantly reduces the extent of vertical inequality as measured by the Gini coefficient for final equivalent income, and redistributes to families in the lowest decile. It also reduces the degree of horizontal inequality by transferring broad income to those income unit types who are, on average, below the overall equivalent mean at a cash-income disposable income level.

Over the time-frame of the analysis, whilst the final pattern of inequality revealed was not dramatically altered with the inclusion of the social wage, it reduced the apparent rate of increase in inequality observable at the disposable income level. In particular the provision of income-in-kind was significant in increasing the relative living standards of low to middle Australia, those families in the fourth and fifth deciles of the equivalent income distribution, where the social wage was particularly important. This was especially noticeable when using the annual basis of the data obtained from the microsimulation model, we were able to calculate the 'truer' cumulative change in real final income over the period of the Labor Government.

An analysis based purely on money-income, as undertaken in Section 3, reveals a totally different pattern of change in that 1981-82 to 1989-90 period and which, in consequence, could lead to a misinterpretation of both the pattern and extent of living standard change. The social wage is clearly an important element of government redistribution.

7 The Social Wage as a Relative Redistribution Mechamism

Whilst the previous section considered the impact of the social wage in effecting the distribution of cash-money disposable income to determine the broader concept of final income, the operation of this on a **relative** basis compared to the other redistribution mechanisms considered in the Report - the social security system and the taxation system - can also be ascertained through the microsimulation. In combination, all three mechanisms act to significantly affect the original or primary distribution of income determined through the supply of factors of production, be they labour or capital. It is often through such direct redistribution mechanisms that governments are measured in terms of any explicit or implicit equity goals of the community.

Given that all three mechanisms of redistribution - income taxation, cash social security payments **and** non-cash social wage expenditures - have been shown to significantly affect the distribution of well-being and living standards amongst income units, in this chapter we explicitly focus on their relative contribution.

In general, these direct instruments of redistribution, through the provision of cash and non-cash benefits financed by taxation, are provided to:

- counteract some perceived or actual disadvantage in the market place due to some attribute of an individual (such as age, parenthood or disability);
- alleviate financial need (with resultant social phenomena) based on these particular circumstances (including unemployment and sickness);
- explicitly result in a society which is more equal in its capacity to provide participation and choice to people in the product exchange-markets; and
- to ensure that no person is denied access to particular services that are considered important for the longer-term maximisation of efficiency and minimisation of the deleterious social effects of on-going or exacerbated forms of inequality.

Whilst the objectives of such policy is to improve both efficiency or the maximisation of the output of a society from its available resources, and equity on the distribution of both opportunity and output, in terms of the latter, they are more commonly divided in two forms. The first is horizontal equity, the equal treatment of equals and the other is vertical equity, the unequal treatment of equals to achieve more equal distribution of resources.

Each of the three mechanisms impacts upon all these to varying degrees. The direct cash benefits provided through social security, aims to improve the opportunity to participate in the market economy, through the provision of pensions, for more

permanent characteristic disadvantages such as age, and benefits, for what are considered more temporary or transient circumstances such as unemployment and sickness. The taxation system is generally based more on vertical equity objectives and the principle of 'equality of sacrifice'; and the social wage, particularly health and education expenditures, is based more on minimisation of both the intergenerational transmission of inequality and the denial of access based on deficiency of cash income.

Whilst it can be argued that income tax (as well as other forms of taxation) are levied to finance both social security and the social wage (as well as other forms of expenditure), each stage encompasses its own form of redistribution and its impact differs both on particular family types and particular deciles in the income distribution.

7.1 Relative Contribution to Living Standards

In order to ascertain the relative effect of each form of government intervention, we begin by examining the contribution of each income source, both cash and non-cash and private and government-sourced, to the living standards of income units distinguished either by relative income or family type.

Relative Income

In Table 7.1, all income sources from the market (private) and government (social security and social wage) are added together to form a concept of 'gross' final income, that is, prior to tax payment. That table shows that the bottom two deciles, when ranked and distributed by net equivalent final income, receive about 30 per cent of their gross final income from payment for the exchange of their factor services in the private economy, and about 20 per cent in the form of the provision of social wage expenditure. The remaining 50 per cent comes through the provision of direct cash social security benefits. From this they pay only 1 per cent back to the government in the form of income taxes such that, as indicated in the last column, 69.7 per cent of the final (net) income is in the form of government transfers of either a cash or non-cash type.

As an income unit's capacity to participate and sell their factors rises, with consequent effect on their total income, with eligibility conditions and family circumstance, so does their receipt of social security and social wage allocations relative to that private income. Thus, for the top tenth decile, private income in 1989-90 comprised almost 97 per cent of gross final income, with the remainder which was overwhelming received in social wage allocation, falling to a mere 3 per cent. Out of this they paid 24 per cent in taxes.

In sum, the mean average income unit received 68 per cent of gross final income in the form of private income and 15 per cent and 17 per cent respectively in the form

Table 7.1: Contribution of Income Sources and Transfers to Final Income by Decile: 1989-90

Final (Net) Income Decile	Private Income	Social Security	Social Wage	'Gross' Final Income	Taxes as % of Gross Final	Transfers as % of Final (Net)
1	30.0	50.5	19.5	100.0	1.0	69.7
2	29.9	51.3	18.8	100.0	2.6	69.3
3	42.4	38.3	19.3	100.0	4.8	55.5
4	59.6	22.6	17.8	100.0	8.6	34.8
5	61.0	19.3	19.7	100.0	10.0	32.2
6	75.0	10.4	14.6	100.0	12.8	14.0
7	84.1	6.1	9.8	100.0	15.5	0.6
8	91.6	1.8	6.6	100.0	18.4	-12.3
9	94.3	1.0	4.7	100.0	19.6	-17.3
10	96.8	0.3	2.9	100.0	24.0	-27.4

of social security and social wage allocations. Of note is the consistency of contribution of social wage (about 20 per cent) to gross final income for the first five deciles before it begins to drop off. In comparison, the social security contribution drops off rapidly.

Thus, as may be expected, those in the bottom two deciles are dominantly dependent upon cash payments in the form of social security. Whilst, the social wage is never the dominant source of income for any decile group, it is, however, consistently significant for the bottom half of the population of income units. For the top six deciles, government transfers in the form of the social wage are more significant than cash transfers via social security, reflecting their universal provision, dependent only upon age and presence of children, and the absence of income criteria to determine eligibility for these payments.

Taxes, of course, are a direct function of income, almost solely private rather than cash social security payments. Income in the form of social wage allocation is overtly not subject to such taxation. Consequently, taxes increase as a percentage of gross broad income, reflecting not merely the higher income in the higher deciles but also the increased proportion of private income as a contributory source of that income.

In consequence, if we net out transfers to and from the government sector, such that the household or personal sector 'gains' from a transfer to it of social security and social wage allocations but 'loses' from a transfer of income tax to the government, then we are able to identify the net 'gainers' and 'losers' of government intervention. The final column of Table 7.1 outlines these net transfers as a percentage of final equivalent income after tax, the concept used in the previous chapter to define overall living standards and consequent inequality.

From this column, we can note that the lowest seven deciles all gain from direct government activity. On the other hand, the top three deciles contribute more in taxes, than they receive back in either cash or in-kind allocations of government spending.

None of the above is a surprising result, with the possible exception of the consistency of the contribution of the social wage in the lowest five deciles. However, what is of greater interest is to compare this over time, and note any changes in the pattern of redistribution. Following the procedures we adopted in the earlier sections, Table 7.2 replicates the 1989-90 analysis in Table 7.1 for the year 1982-83, immediately prior to the election of the Labor government, and Table 7.3 the absolute difference in the percentages obtained for the two years.

At first glance Table 7.2 shows little substantive change to the broad conclusions derived above. Lower-income deciles in 1982-83 were more reliant upon government-sourced income, with social security cash payments predominant in the lowest quintile. The contribution of the social wage was again a consistent percentage for the lowest five deciles. However, net transfers as a percentage of after-tax final income were more dispersed both positively and negatively, with consequent larger range. Moreover, in 1982-83 it was the top four deciles that were net contributors rather than recipients from government, as distinct from only three in 1989-90.

These subtle but important shifts in redistribution are highlighted in Table 7.3 showing the difference between 1989-90 and 1982-83 (that is, Table 7.1 less Table 7.2). However, it must be recalled that because the data are not longitudinal panel data, the actual income units in the bottom decile in 1989-90 for instance are not necessarily (and indeed are unlikely to be) the same families as those in the bottom decile in 1982-83. That is, the data do not measure movements in family living standards over time.

In respect of the comparison highlighted in Table 7.3, clearly it is both the extent of change in the private economy and in the labour and capital markets that determine the extent of total gross final income received from private sources each year. As employment increases then not only would we expect private income to increase, per se, but also, given eligibility conditions in the social security system tied to labour-market participation and reward, we would expect social security contribution to decline. Given the differential impact of this by age and family size as income units moved in ranking, we would expect the social wage allocations of health and education reflecting age and number of school children to change also. Over-riding this of course, is the total allocation of such funds from government dependent upon the total revenue raised, through taxes, economic attitudes to the provision of a government deficit or surplus, and, direct priority shifts by government.

Table 7.2: Contribution of Income Sources and Transfers to Final Income by Decile: 1982-83

Final (Net) Income Decile	Private Income	Social Security	Social Wage	'Gross' Final Income	Taxes as % of Gross Final	Transfers as % of Final (Net)
1	25.3	55.5	19.2	100.0	0.1	74.7
2	23.6	57.9	18.5	100.0	0.9	76.2
3	38.5	42.9	18.6	100.0	2.9	60.4
4	55.5	25.9	18.6	100.0	6.4	40.7
5	64.2	18.0	17.8	100.0	9.0	29.4
6	80.3	8.3	11.4	100.0	13.1	7.6
7	86.5	5.0	8.5	100.0	15.6	-2.5
8	92.1	1.8	6.1	100.0	18.1	-12.4
9	94.8	0.9	4.3	100.0	20.0	-18.5
10	97.2	0.4	2.4	100.0	27.3	-33.7

Table 7.3: Absolute Difference in Relative Income Contribution by Decile: 1989-90 and 1982-83

Absolute Decile	Private	Social Security	Social Wage	Taxes as % of Gross Final	Net Transfers as % of Net Final
1	+4.7	-5.0	-0.3	+0.9	-5.0
2	+6.3	-6.6	+0.3	+1.7	-6.9
3	+3.9	-4.6	+0.7	+1.9	-4.9
4	+4.1	-3.3	-0.8	+2.2	-5.9
5	-3.2	+1.3	+1.9	+1.0	+2.8
6	-5.3	+2.1	+3.2	-0.3	+6.4
7	-2.4	+1.1	+1.3	-0.1	+3.1
8	-0.5	0.0	+0.5	+0.3	+0.1
9	-0.5	+0.1	+0.4	-0.4	+1.2
10	-0.4	-0.1	+0.5	-3.3	+6.3

The comparison of the relative contribution in 1982-83 and 1989-90 in Table 7.3 reveals:

- the contribution of private income increased particularly for the first to fourth deciles reflecting economic, and particularly employment, growth in the period under review;
- the consequent decrease in the relative contribution of social security for these lowest four deciles;
- for all other deciles, the contribution of both the social security and social wage allocations increased with lower proportions from private sources;

- between the two forms of government provision - cash and non-cash - it was the latter social wage that showed the greater relative increase both overall and in each decile;
- reflecting greater targetting of cash benefits to 'those in need', the small increase in relative social security provision was far less in the top three deciles than the fifth, six and seventh deciles; and
- the more uniform increase in social wage contribution to 'gross' final income across deciles.

In summary, three distinct patterns emerge. For the first four deciles there is increased relative contribution from private income sources. For the fifth to seventh deciles the relative decline in private income is countered by the relative increase in social security payments possibly reflecting the introduction of the Family Package for 1989-90. However, for these deciles the increased relative contribution of the social wage as income component is even larger than the social security increase. In fact, most of the relative gain in the social wage contribution is concentrated in that middle grouping. Finally, for the top three (eighth to tenth) deciles the small, marginal decline in the contribution of private or market income sources is matched not by any change in social security but by a concomitant marginal increase in the social wage component contribution.

On the taxation side, a clear dichotomy between the top and bottom five deciles occurs as the burden per income unit shifted over the period. For the lowest half of the distribution taxes increased as a proportion of 'gross' final income received. On the other hand, with the exception of the eighth decile, the proportion of final income paid in personal income tax fell for the top half of the distribution between 1982-83 and 1989-90. In particular, reflecting measures discussed earlier in Sections 3 and 4, this decline was substantial in the highest decile (tenth).

When these factors - income receipts from government in the form of cash social security and in-kind social wage expenditure, and income payments to government in the form of tax - are considered, net transfers from government actually declined as a proportion of net final income for the lowest four deciles. Conversely, they increased for each of the top six deciles, particularly the sixth and the tenth. More specifically, increased tax payments and reduced social security receipts as a consequence of increased private income saw the bottom four deciles become less reliant upon government transfers. For the fifth and sixth deciles, increases in both the social wage and social security receipts from government resulted in an increase in relative net government transfers. For the seventh decile these increased allocations were sufficient to reverse the situation in 1982-83 where that decile contributed more by way of income tax to government than it received as social wage or social security to a situation in 1989-90 where the seventh decile was a net 'gainer'. For the eighth and ninth deciles, it was increases in the social wage that was the dominant force in reducing the net payment to government. Finally, for the tenth decile, it was the reduction in tax, largely from the introduction of dividend imputation as we have seen, that reduced the net payment to government.

The conclusion is that over the period, there was:

- less reliance on government by the lowest income units;
- greater receipt of social benefits from government for the middle deciles; and
- less tax transfer to government from the top deciles.

Income Units Totally Reliant Upon Government

For those with zero private income, the government transfer system of cash and non-cash benefits is, of course, critical. For these income units their entire capacity to participate in the economy in general (and arguably in society) depends upon their access to their benefits and services. Thus, their living standards are totally dependent upon the actions of government, and generalising the thought behind Simone de Beauvoir's famous comment that a society can be judged by how it treats its elderly, so it can, or government can, by how it treats this group. The numbers in such circumstances depend each year largely on the labour market and age structure and as such vary over the period of analysis, from a peak of 11.5 per cent in 1985-86 to 10.2 per cent in 1989-90, as indicated in Table 7.4. Thus, in general, the fortunes of the bottom decile show the relative fortunes of this group in all that has been examined in this Report.

It is notable that a convex pattern emerges from the simulation which, when related to the conversely broadly concave pattern of inequality indicated in Figure 6.1 and Table 6.1 (with the exception of 1981-82), indicates the significance of government expenditure provision to this group as a factor in determining the level of final inequality. That is, from 1981-82 to 1988-89, the proportion of income units receiving zero or nil private income increased to the middle of the period then decreased. Yet over that time as shown in Table 3.1, the level of inequality decreased and then increased. In other words, paradoxically, in general, the greater the proportion of income units receiving no private cash income the less was the resultant degree of inequality. Clearly, changes to this group reflect changes through redistribution measures for the whole community, given eligibility conditions and income tapers on social security provision.

Prior to considering the impact of redistribution measures for this critical group, it is worthwhile briefly noting some of the differing trends and peaks by each income unit type in Table 7.4. Since those with nil private income basically reflect labour market changes it is young single people and sole parents who show the greatest volatility. However, it is notable that single people of working age (under 25 and 25-64) both 'peaked' in 1983-84 whereas couples, whilst with a much lower incidence of zero income, 'peaked' two years later in 1985-86. Since 1985-86, all working-age groups showed a decline, despite our earlier analysis indicating increased inequality which suggests that inequality change had less to do with

Table 7.4: Estimated Percentage of Income Units, by Type, in Receipt of Zero Private Income: 1981-82 to 1989-90

	Single			Couples without children		Couples with children	Sole parent	Overall
Year	<25	25-64	65+	<65	65+			
1981-82	7.8	14.1	30.6	3.9	15.0	2.4	27.5	10.4
1982-83	9.7	15.1	30.5	4.3	15.0	3.8	28.6	11.1
1983-84	10.0	15.3	30.4	4.4	15.0	3.9	23.5	11.3
1984-85	9.3	14.8	30.3	4.5	15.0	3.8	21.4	11.4
1985-86	9.1	14.5	30.1	4.6	15.1	4.1	22.9	11.5
1986-87	8.6	14.3	30.0	4.4	15.1	4.0	18.8	11.3
1987-88	8.3	14.1	30.0	4.3	15.1	3.8	16.6	11.1
1988-89	7.2	13.6	30.0	4.3	15.0	3.4	14.3	10.5
1989-90	7.1	13.6	30.0	4.2	15.0	3.2	12.6	10.2

employment per se than changes in the nature of employment and other non-labour incomes. (See also Raskall, McHutchison and Urquhart, forthcoming, for specific decomposition analyses of inequality change in this period from other data sources).

As anticipated the income unit types with the largest relative numbers receiving no private income are the elderly with 30 per cent of over 65 year-old singles, and 15 per cent of such couples in these circumstances. More surprisingly, a greater proportion of middle-aged single person income units received zero income from private sources than young singles. The latter were possibly more able to obtain part-time or casual employment providing some income. The result may also reflect increased disability amongst middle-aged single people, and the fact that in defining the age up to 64 we include a number of women who were eligible for the age pension. The incidence of zero private income amongst sole parents whilst still high in 1989-90 shows a relatively consistent trend downwards particularly since 1985-86 possibly reflecting increased part-time employment opportunities, greater availability of child-care and an increased proportion of employed divorced people amongst this category. As expected, couple income units have the lowest zero private income incidence rate.

With the exception of that small but changeable proportion of government social security cash benefits which are subject to tax, this group pays little or no tax, and thus is little affected by changes in the taxation system. In general terms, the real value of these government benefits (cash and non-cash) increased dramatically between 1982-83 and 1984-85 with a 5 per cent real increase in unadjusted terms between 1982-83 and 1983-84 and an 8.7 per cent real increase between 1983-84 and 1985-86, largely, but not solely, from an increase in social wage allocation. Since then, with minor changes due to either the timing of increases (such as in 1985-86) or differential treatment of specific income units such as the young

unemployed, the overall value of cash and non-cash benefits was maintained on a per income unit basis in real terms. In part, this reflects the automatic indexation of many pensions and benefits. A similar pattern is also evident on an equivalent income unit basis.

However, when examined by specific income unit type through the simulation, whilst this general conclusion holds for most types, for sole parents, total benefits per family, having risen in real terms by 13 per cent between 1982-83 and 1984-85, continued to increase a further 13 per cent over the five years to 1989-90. On the other hand, for young (under 25) single income units, following a similar 13 per cent between 1982-83 and 1984-85, the real value of the benefits received from government declined by that amount to 1989-90, so that the benefit in 1989-90 for each single person income unit equated in real terms to the level of 1982-83. The proportion of these benefits received in cash and non-cash form depends of course on specific income unit type, as indicated in the previous section, given the age and child basis for the social wage elements health and education we have included here.

Table 7.5 documents the proportions of non-cash social wage benefits received by each income unit type over the period as a proportion of all non-cash and cash (social security) benefits received. These proportions refer to the average of each type and thus will differ depending on age (for health) and in the case of couples with children and sole parents on the number of children this dependent group has.

In general, the relative significance of non-cash social wage benefits compared to cash benefits increased across all income unit types during the period 1981-82 to 1989-90. For working age single people and childless couples this averaged about one-sixth of all government benefits. However, for elderly income units and those with children, as may be expected, the contribution was considerable at about four-tenths and increasing. Overall, just under one-third of all benefits provided to those with zero private income was in the form of non-cash benefits. Clearly, the social wage is very significant for the living standards of this group, and increased in significance up to 1989-90.

Income Unit Type

Analogous to the earlier analysis of the contribution of each redistributive measure to gross final income, by equivalent income deciles, we can broaden our consideration of the zero private income cohort to examine each income unit type mean average.

Table 7.6 outlines in the first three columns the contribution of private or market-sourced income, social security cash payments and in-kind social wage allocation to total gross final income, respectively, for 1989-90. As in Table 7.1 these three components sum to 100.0 per cent. In the fourth column total income taxes paid to government as a proportion of this gross income concept is shown for each income unit type and in the fifth column the net gains from government in the form of social

Table 7.5: Non-cash Benefits as Proportion of Total Net Benefits, Income Units with Zero Private Income: 1981-82 to 1989-90

	Income Unit Type							
	Single			Couples without children		Couples with	Sole	Overall
Year	<25	25-64	65+	<65	65+	children	parent	(Unadjusted)
1981-82	13	15	35	16	34	38	36	29
1982-83	12	14	34	15	33	38	39	29
1983-84	12	14	35	16	34	38	43	30
1984-85	13	16	38	18	37	39	40	31
1985-86	14	16	38	18	37	40	40	32
1986-87	14	16	38	18	38	40	39	32
1987-88	14	16	38	18	37	38	48	32
1988-89	15	16	38	18	38	38	42	32
1989-90	15	16	38	18	37	37	41	32

Table 7.6: Relative Contribution of Income Sources by Income Unit Type: 1989-90

Income Unit Type	Private	Social Security	Social Wage	Taxes as % of Gross Final	Net Transfers as % of Net Final	Social Wage as % of All Govt. Receipts
Single						
<25	91.0	5.3	3.7	15.1	-7.2	41
25-64	88.3	7.9	3.8	19.9	-15.9	33
65+	25.4	44.2	30.4	3.2	73.8	41
Couples without children						
<65	90.7	4.5	4.8	19.4	-12.6	51
65+	35.8	38.1	26.1	4.2	62.6	41
Couples with children	82.4	4.1	13.5	17.7	-0.6	78
Sole parent	48.8	27.9	23.3	8.3	46.8	46

security and social wage less taxes paid as a proportion of net final income is presented. Finally, the proportion of government benefits cash (social security) and non-cash (social wage) received by each income unit type in the form of the latter social wage allocation is outlined in the final column. In Table 7.7 this is replicated for 1982-83 and in Table 7.8 the absolute difference between the two points in time is shown.

Thus, in 1989-90, from Table 7.6, 91 per cent of the average gross final income of young (under 25) single person income units comes from private sources (mainly

Table 7.7: Relative Contribution of Income Sources by Income Unit Type: 1982-83

Income Unit Type	Private	Social Security	Social Wage	Taxes as % of Gross Final	Net Transfers as % of Net Final	Social Wage as % of All Govt. Receipts
Single						
<25	90.1	6.8	3.1	14.2	-5.0	31
25-64	88.3	8.3	3.4	19.9	-10.4	29
65+	24.4	48.0	27.6	2.8	74.9	37
Couples without children						
<65	91.2	4.7	4.1	20.0	-14.0	47
65+	34.8	41.6	23.6	1.6	66.3	36
Couples with children	82.6	4.4	13.0	18.5	-1.4	75
Sole parent	44.4	30.4	25.2	6.7	52.4	45

Table 7.8: Absolute Difference in Relative Contribution by Income Unit Type: 1982-83 to 1989-90

Income Unit Type	Private	Social Security	Social Wage	Taxes as % of Gross Final	Net Transfers as % of Net Final	Social Wage as % of All Govt. Receipts
Single						
<25	+0.9	-1.5	+0.6	+0.9	-2.2	+10
25-64	0.0	-0.4	+0.4	0.0	-5.5	+4
65+	+1.0	-3.8	+2.8	+0.4	-1.1	+4
Couples with children						
<65	-0.5	-0.2	+0.7	-0.6	+1.4	+4
65+	+1.0	-3.5	+2.5	+2.6	-3.7	+5
Couples without children	-0.2	-0.3	+0.5	-0.8	+0.8	+3
Sole parent	+4.4	-2.5	-1.9	+1.6	-5.6	+1

labour wages), 5.3 per cent from social security cash payments and only 3.7 per cent from the two components of social wage expenditure, health and education we consider. Of that total, 15.1 per cent is paid back to government in taxes, implying that this cohort on balance pays 7.2 per cent of its net final income to government. Of the small relative amount of benefits it does receive from government, the social wage makes up 41 per cent.

The first point to note is that the variation in relative source of income between mean average income unit types is dramatic. Perhaps surprisingly, young singles are most

reliant upon private income sources, marginally ahead of childless couples and middle-aged single people, and couples with children. As reflected in earlier analysis, it is the elderly (particularly elderly single people) and to a lesser extent sole parents who receive the predominant income from government as distinct from private sources. Life-cycle factors are clearly important in determining reliance on the government sector.

Reflecting the amount of taxes paid (and thus relative quantum of income received, particularly private) again this dichotomous split occurs, with both single and couple cohorts of working age being net providers and the elderly and sole parents being the net receivers of government transfers. With their higher relative incomes, it is the mid-aged singles (25-64) and childless couples that are the greatest relative 'losers' from government redistribution. Of the cash and non-cash benefits received from government, the final column of Table 7.6 indicates that for all groups the social wage component is substantial, compared to social security particularly so for couples, both with children and without, where it is more than half. For all the others, despite (or because of) their reliance on social security, it averages a little over 40 per cent, with the exception of mid-aged singles where it drops to one-third.

Whilst this broad pattern holds when we consider Table 7.7 with the analogous data for 1982-83, as indicated by Table 7.8, subtle but significant changes occurred over the course of the Labor Government up to 1989-90. Reflecting the increased significance of the social wage overall over the period, its contribution increased for all income units except sole parents. For sole parents, the increase in employment opportunities meant that the increase in private income was even larger. Conversely, a combination of tightened eligibility criteria and enhanced employment opportunities particularly for part-time work saw marginalised cohorts of sole parents and young singles receive increased contribution from private market sources, in this period. Similarly, for the elderly cohorts, in combination with increased income from capital through interest rates, the contribution of private income rose also. In consequence, these groups also paid more, relative to total gross final income received, in taxes to government. Reflecting the relative decline in significance of private income and changes to the tax system, couples paid a lower proportion. From these movements, reflected in the changes in net transfers from government, mid-aged singles (25-64) and sole parents paid more to, and received less from, government, respectively. On the other hand, couples, whether with or without children, whilst still net contributors to government, were much less so in 1989-90 than in 1982-83.

Of particular note is that for all cohorts, on average, the contribution of the social wage compared to social security increased dramatically, none more so than for young (under 25) single person income units, where social wage (in fact health expenditure) increased from 31 per cent to 41 per cent of all benefits received from government. This also reflected less reliance on social security payments. For the others, the increased relative contribution was between 3 and 5 per cent, except for sole parents where the social wage only increased by 1 per cent relative to social security. This later figure may reflect a change in the typical demography of the

average sole parent in addition to the relatively slower growth in education spending which is also evident in the relative social wage change of the other cohort with children, couples.

In summary, again it is evident that the social wage increased in the period as a contributor to living standards compared to both social security and, in general, private income sources. The significance of the social wage as a redistributive mechanism relative to other forms of government intervention would have increased over the period. Private income sources became more significant for those groups generally considered marginalised in the labour market, the young and sole parents, and for a different reason, the elderly, as returns on capital investment increased.

When more detailed analysis is undertaken in comparing the real value per income unit of each form of transfer over the period for each type of income unit, three distinct periods became discernible:

- in the period 1983-84 and 1984-85, average real social security expenditures reached their peak for every income unit type and overall. The introduction of the 'Family Package' could be expected to increase this after 1990 for families with children;
- in the period 1985-86 and 1986-87, average real tax payments per family were at their peak for virtually every income unit type and overall. The exception to this was for sole parents where, with increased labour force participation, this group attained a real tax payment peak in 1989-90;
- in 1988-89, average social wage (health and education) receipts in real terms peaked for all categories of single people and the elderly, that is, childless groups; and
- conversely, for those groups with children, whether couples or sole parents, such average real social wage expenditure reached a peak either in 1984-85 and 1985-86. The demographic numbers of these groups were such as to peak the overall social wage allocations in real terms in these years.

7.2 Horizontal Inequality

As can be expected from the significance of each of these mechanisms of redistribution available to government the net impact of actually redistributing such income is significant both horizontally across income types and vertically between income units with different equivalent income.

We have already referred to the impact of the social wage in particular in redistributing final income to the elderly and families with children (see Section 6.4). This reflects the nature of the expenditures included, health and school education. The incorporation of other forms of expenditures such as tertiary education could well alter at least the strength of the apparent horizontal redistribution.

With that caveat we can examine the explicit relative contribution of each of the three mechanisms of government redistribution on horizontal inequality between income unit types by an analysis analogous to that undertaken in the previous chapter in respect of the impact of the social wage (see Section 6.4 and Table 6.8).

In Table 7.9 we show the mean average income of each income unit type as a proportion of the overall average income of all income unit types, firstly for private income for each year in the period of analysis. The impact of the social security system (cash payments from government) is considered by the change in these respective average income unit proportions between the private and gross cash income concepts. Similarly in the third segment of the table, the change between gross cash and disposable is outlined, reflective of the impact across various income units of the tax system. Finally, the difference between the relative mean incomes at cash disposable income concept and the final income level incorporating the in-kind social wage allocations provides an indication of the impact of that social wage on relative horizontal inequality between income unit types. This final segment of Table 7.9 reproduces the last segment (segment III) of Table 6.10 in the previous chapter.

By comparing the changes inherent in the addition of each form of redistribution we can ascertain the relative impact of each on ensuring equality of mean incomes between income unit types of differing composition. As in the previous chapter we utilise the equivalent income basis to extract differences between units based purely on demographic considerations.

From Table 7.9 it can be seen that all elements of government intervention act to increase horizontal equality. That is, in general, those income unit types with the lowest mean private income compared to the average (sole parents and the elderly) are the beneficiaries of this government redistribution. On the other hand, those income units most above the average at the private income level (mid-aged singles and couples without children) tend after redistribution to be brought closer to the overall mean. However, the contribution of each form of redistribution differs for each type.

For the elderly, whether on their own or as couples, the prime force in increasing their relative income is the social security system as indicated in segment II. About half of that contribution is also made by the social wage, which is also more significant than the tax system, which raises relative income of the elderly by about one third the impact of social security. For single people over 65 years of age, the social wage and social security system are more significant in raising relative living standards than for elderly couples both in absolute terms and in comparison to the tax system.

For sole parents, again, the social security system is the prime contributor to raising the relative living standards of that group. However, for this income unit type the contribution of the social wage is almost as significant, with the mean over the period of analysis increasing relative incomes by 14 percentage points of the overall

Table 7.9: Importance of Various Redistribution Mechanisms to Horizontal Inequality by Income Unit Type: 1981-82 to 1989-90

	Income Unit Type							
	Single			Couple without children	Couple without children	Couple with children	Sole parent	Total
Concept:Year	<25	25-64	65+	<65	65+			
I Private								
1981-82	92	134	20	156	30	118	41	100
1982-83	90	138	22	157	32	117	38	100
1983-84	91	138	21	157	32	117	38	100
1984-85	93	141	21	154	32	116	39	100
1985-86	93	140	23	154	33	115	40	100
1986-87	90	139	23	157	34	116	41	100
1987-88	92	139	22	156	33	116	41	100
1988-89	92	137	23	156	34	116	42	100
1989-90	92	138	24	155	35	115	45	100
Mean	91.7	138.2	22.1	155.8	32.8	116.2	40.6	100
II Social Security								
1981-82	-6	-4	+33	-11	+29	-9	+16	-
1982-83	-5	-7	+34	-12	+30	-9	+18	-
1983-84	-6	-6	+35	-13	+30	-9	+19	-
1984-85	-6	-7	+36	-13	+30	-10	+19	-
1985-86	-6	-6	+34	-12	+29	-9	+18	-
1986-87	-6	-6	+34	-13	+29	-10	+18	-
1987-88	-6	-6	+35	-13	+30	-10	+18	-
1988-89	-7	-6	+34	-13	+29	-10	+18	-
1989-90	-7	-6	+34	-13	+29	-9	+17	-
Mean	-6.1	-6.0	+34.3	-12.6	+29.4	-9.4	+17.9	-
III Income Tax								
1981-82	+3	-4	+10	-5	+10	-4	+6	-
1982-83	+3	-4	+10	-5	+9	-4	+6	-
1983-84	+4	-5	+11	-5	+11	-5	+6	-
1984-85	+3	-5	+10	-4	+11	-5	+5	-
1985-86	+4	-6	+10	-5	+11	-5	+6	-
1986-87	+5	-6	+11	-6	+9	-5	+6	-
1987-88	+3	-5	+9	-4	+10	-3	+5	-
1988-89	+1	-5	+9	-4	+10	-3	+5	-
1989-90	+2	-5	+9	-4	+9	-4	+6	-
Mean	+3.1	-5.0	+9.9	-4.7	+10.0	-4.3	+5.9	-
IV Social Wage								
1981-82	-6	-9	+17	-9	+14	+6	+14	-
1982-83	-7	-9	+17	-9	+14	+6	+14	-
1983-84	-7	-9	+18	-8	+14	+7	+14	-
1984-85	-8	-10	+20	-10	+16	+7	+14	-
1985-86	-8	-10	+19	-9	+15	+6	+15	-
1986-87	-8	-10	+20	-9	+16	+7	+14	-
1987-88	-8	-10	+20	-9	+16	+7	+14	-
1988-89	-7	-9	+20	-9	+16	+6	+14	-
1989-90	-7	-10	+19	-8	+16	+6	+12	-
Mean	-7.3	-9.6	+18.9	-8.9	+15.2	+6.4	+13.9	

average compared to 18 percentage points by social security. The tax system, also an horizontally equilibrating mechanism is of much lesser impact of 6 percentage points.

For couples without children, whose private income is on average almost 56 per cent more than the mean, even on equivalent income terms, all elements on redistribution reduce this disparity with the social security system again being dominant in reducing it by 12.6 percentage points in itself. Again, though, the impact of the social wage is almost double that of the tax system at 8.9 percentage points compared to 4.7 for the latter.

For 25-64 year-old single person income units the movement towards the overall mean is brought about more by the social wage reducing its above mean average income by almost 10 percentage points compared to six and five percentage point reductions from social security and tax respectively.

For couples with children, the combination of a 9.4 percentage point reduction from social security and a 4.3 percentage point reduction from taxation, almost eliminates the initial 16.2 percentage by which their mean private income exceeds the overall average. However, a 6.4 percentage point increase contingent upon the social wage allocation in part restores this initial disparity.

Finally, and as for couples with children, the social wage acts to exacerbate horizontal inequality for young (under 25) single people. Here, from an initial mean income almost 8 per cent below the overall mean, the social security system acts also to place them a further six percentage points below the mean. Whilst, the tax system partly restores this relative disparity by moving this group three percentage points closer to the overall average, the social wage has the largest impact in moving relative income 7.3 percentage points further away from the overall mean.

Thus, for five of the seven income unit types considered, the social security system has the greatest impact on relative equality between the mean incomes of the groups. For the other two (single people under 25 and between 25 and 64), it is the social wage which has the largest impact, although in the former case, for young singles it has the effect of adding to their relative inequality. In all cases, the social wage has a greater impact on horizontal equality between groups than the taxation system, although given the objectives outlined in the introduction to this chapter this is to be expected. The taxation system, a priori, is more concerned with vertical equality between groups on different incomes. However, in terms of actual outcomes the conclusion must be that the social wage is a more significant contributor to horizontal equality change than the tax system, but in general, is still not as significant as the social security (cash payments) system.

In looking at changes over the period of analysis, what is notable is the relative stability of the redistribution mechanisms in impacting upon relative incomes between these groups. Only in a few cases are there increases or decreases of more than one per cent. Even then, surprisingly, in view of its overall relative insignificance in affecting horizontal inequality, most of these changes occur in the

tax system, particularly for young singles. However, the social wage does appear to have increased in significance compared to the other mechanisms, particularly for the elderly cohorts, both single and couples.

7.3 Vertical Equality

Overall Results

In the final part of this section, concerned with the relative contribution of each form of government redistribution, we consider the impact of all the changes indicated earlier on vertical equality, that is, how social security, taxation and the social wage, both separately and in combination act to reduce inequality between groups ranked by private income.

Figure 7.1 presents the value of the Gini coefficient measure of inequality for each of the various concepts of income over the 1981-82 to 1989-90 period. The astute reader will note that this is the same as Figure 6.1 in the earlier section. However, because our interest is in the magnitude of change in the Gini by each concept, rather than the earlier interest in change across the years, all concepts here are graphed on the same ordinal scale, rather than the differential scale utilised earlier which highlighted the wave-like pattern over time. Thus, from Figure 7.1 we can readily ascertain the extent to which the Gini coefficient at the gross level is substantially less than the coefficient at the private level. That difference reflects the impact of the social security system in reducing apparent inequality between all income units. As before, equivalent income is used as the appropriate concept of income so that inequality measured by the Gini coefficient reflects 'true' inequality rather than that which merely arises from differences in the size and composition of income units.

If the difference between private and gross income levels reflects the operation of the social security cash transfers system, then the difference between gross and disposable can be considered as reflecting the impact of the personal income tax system and that between disposable and final as reflective of the impact of the social wage components of government spending we have considered, health and school education.

It is readily apparent from this figure that the social security system over-rides both tax and the social wage in significance, as the mechanism reducing inequality by the greatest relative extent. The tax system and the social wage contributed each about the same and in combination slightly less than the social security system. Over the period, it is also apparent that the tax system declined as a redistributive device, whilst the social wage increased, until towards the end it appears to exceed the tax system. This is despite the fact that the social wage allocations comprised between one-half and two-thirds of the quantum dollar amount involved in transfer of the tax system (see Table 5.1).

Figure 7.1: Income Distributions, Including Contribution of Social Wage: 1981-82 to 1989-90

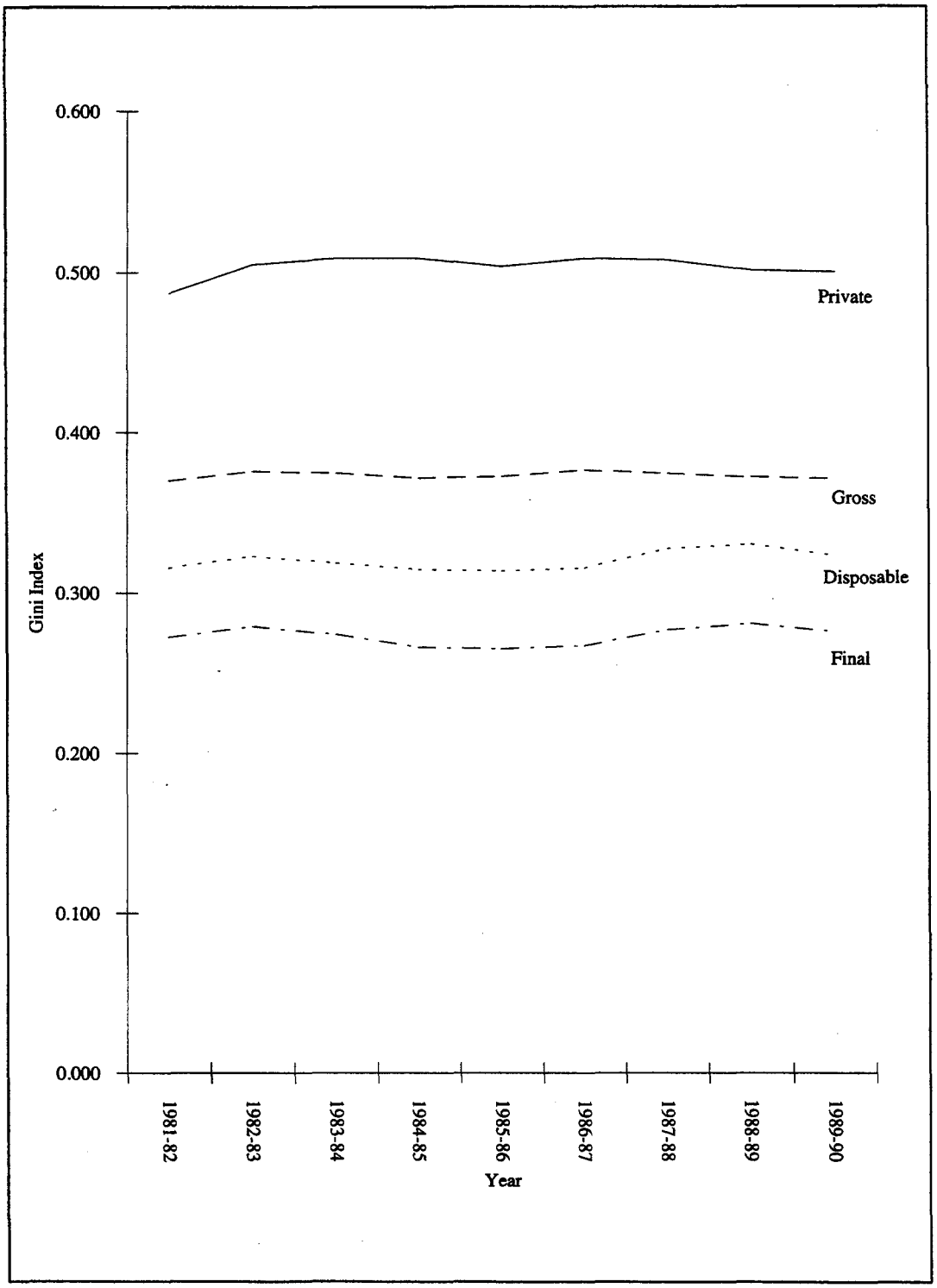


Table 7.10 outlines these absolute differences in the Gini coefficient for each form of transfer (and is derived from Table 6.1). Several points are notable from Table 7.10. Firstly, the extent of inequality reduction in consequence of the social security system is related to the degree of private income inequality. In general, the greater the latter then the greater the former. In consequence, the absolute reduction in the Gini contingent upon the social security system appears to be greatest in 1983-84 and 1984-85 when private inequality was greatest. Overall, the social security system reduces the private inequality measure by about 25 per cent.

The second point to note is the dramatic decline in the redistributive impact of the tax system from 1987-88 onwards. As has been noted on often in the text and in particular in Section 4.1, this was largely due to the introduction of dividend imputation in that year which effectively made dividend income, largely received by the top decile only (see Appendix Two), tax-free in the recipients hands. Prior to that year, the redistributive impact of the tax system appeared to be increasing. However, even if reduction in tax redistribution attributable to dividend imputation (see Table 4.2) were restored, the tax system would still have been less redistributive in these final three years of analysis (at 0.052, 0.049 and 0.053 respectively) than at any other time in the period of analysis (with the possible exception of 1982-83). Conversely, the mid-period Review of the Tax System also introduced a number of base-broadening measures such as an extended and explicit real capital gains tax and fringe benefits tax which are not currently incorporated in the simulation analysis. A more conclusive assessment of changes in the redistributive capacity of the tax system would require fuller incorporation of such measures.

However, Raskall, McHutchison and Urquhart (forthcoming) conclude via a decomposition analysis by income source and concept that in the period 1984 to 1988-89, the tax system appeared to become more directed towards reduction in horizontal inequality and less directed towards a vertical inequality reduction.

The social wage, on the other hand, as reflected in Table 7.10, appeared to become more significant in reducing vertical inequality by the mid-1980s in comparison to the early part of the period. The reduction in the Gini coefficient contingent upon incorporation of allocated health and education spending into final income increased from .044 in 1981-82 and 1982-83 to .049 in 1984-85. From then until 1989-90 this level of inequality reduction associated with the social wage continued. However, closer examination of Table 7.10 reveals that this total outcome was made up of two counteracting trends dependent upon net expenditure by level of government, Commonwealth spending through the Budget on the health and education components of the social wage reducing the disposable income Gini by an increasing amount. In 1981-82, Budget spending allocations reduced the Gini by .019. By 1988-89, the reduction attendant upon the social wage allocations of the Budget reached .031. Again, a major discrete increase in redistribution via the social wage occurred in 1984-85. On the other hand, with changes in Commonwealth-State arrangements and relative expenditure on health and education, the redistributive impact of social wage spending other than by the Commonwealth through the Budget was reduced from .025 in 1981-82 to .022 in 1984-85.

Table 7.10: Contribution to Reduction in Inequality of Equivalent Income Distribution of Each Redistributive Mechanism, Absolute Difference in Gini Coefficients: 1981-82 to 1989-90

Year	Private	Social Security	Taxation	Social Wage			Final (Total)
				Budget	Other	Total	
1981-82	.487	-.117	-.054	-.019	-.025	-.044	.272
1982-83	.505	-.129	-.053	-.020	-.024	-.044	.279
1983-84	.509	-.134	-.056	-.022	-.023	-.045	.274
1984-85	.509	-.137	-.057	-.027	-.022	-.049	.266
1985-86	.504	-.131	-.059	-.026	-.023	-.049	.265
1986-87	.509	-.132	-.061	-.026	-.023	-.049	.267
1987-88	.508	-.133	-.048	-.027	-.024	-.051	.276
1988-89	.502	-.129	-.043	-.031	-.019	-.050	.280
1989-90	.501	-.129	-.048	-.030	-.018	-.048	.276

More dramatically, changes in 1988-89 saw the non-Budget components of social wage spending reduce their redistributive impact from .024 in 1987-88 (reflecting an increase from 1984-85) to .019 in 1988-89 and further to .018 in 1989-90. Thus, whilst Budget-sourced expenditure became more redistributive over the period, social wage expenditure sourced outside of the Budget, largely through State government sources became less redistributive. One effect counteracted the other so that there appeared little change in the total social wage impact after 1984-85. As indicated in the previous chapter, this differential impact and trend is largely the consequence of firstly, the greater redistributive impact of health expenditure as distinct from education expenditure and secondly, the increased proportion of such health expenditure in the Budget-sourced social wage spending and the corresponding reduction in health amongst non-Budget-sourced social wage expenditure, contingent upon Commonwealth-State financial responsibility changes.

In comparing these three elements of government redistribution to ascertain their relative significance and changes over time, Table 7.11 presents percentage contribution to the overall reduction in the Gini coefficient from private to final (total public sector) of each mechanism.

Examination of Table 7.11 confirms that the relative as well as absolute significance of the social security system increases at 'peaks' of inequality and reduces at points of lower inequality. The table also shows the dramatic decline apparent in the last three years of the period in the relative contribution of the tax system from about one-quarter of total redistribution to about one-fifth. On the other hand, in the period from 1983-84 to 1988-89, the social wage increased as a relative contributor to total inequality reduction. In that latter year it exceeded the contribution of the tax system, although changes in the taxation system in 1989-90 restored some of the relative redistribution contribution of that system. In terms of the private income

Table 7.11: Relative Contribution to Reduction in Vertical Inequality of Each Redistributive Mechanism, Percentage of Reduction in Gini Coefficients from Private to Final Distribution: 1981-82 to 1989-90

Year	Social Security	Taxation	Social Wage	Total
1981-82	54.4	25.1	20.5	100.0
1982-83	57.1	23.5	19.5	100.0
1983-84	57.0	23.8	19.2	100.0
1984-85	56.4	23.5	20.2	100.0
1985-86	54.8	24.7	20.5	100.0
1986-87	54.5	25.2	20.3	100.0
1987-88	57.3	20.7	22.0	100.0
1988-89	58.1	19.4	22.5	100.0
1989-90	57.3	21.3	21.3	100.0

Gini, the social security system reduced measured inequality by about one-quarter and each of the other two mechanisms by slightly under one-tenth in the later years of the period.

The clear conclusion is that despite the social wage representing less than 60 per cent of the total dollar amount of transfer of the personal income tax system, its contribution to inequality reduction is about the same. Thus, if the sole objective of policy were reduction in vertical inequality then per dollar of transfer involved, social wage expenditure on health and education in general reduces inequality at a rate some 70 per cent greater than tax dollars. Therefore, deficit-reduction measures which aim to cut spending in these areas have a significant effect on vertical inequality. Over-riding this, though, is that despite even less being spent on social security, it reduces apparent inequality by about double the rate of the social wage.

An alternative way of looking at the redistributive significance inherent in a particular measure is to examine the proportionate percentage reduction in the Gini coefficient attendant upon the incorporation of the measure. This index of redistribution is known as the Okner Index, and like the Gini and the Lorenz curve is named for its originator (Okner, 1966). Such an index takes into account the original level of inequality rather than merely considering the absolute value reduction inherent in the change. Thus, the impact of social security is reflected in the percentage change of the Gini at the gross income level, incorporating social security cash payments, compared to the Gini at the disposable income level. Table 7.12 presents the Okner Index for each redistributive mechanism for equivalent income for each year of the period of analysis. All values are percentage reductions in inequality.

Whilst Table 7.12 does not alter the broad conclusions from consideration of the absolute differences above, it does in fact strengthen the conclusion regarding the social wage as an important contributor to vertical redistribution. It is not merely in

Table 7.12: Okner Index of Redistribution of Redistributive Mechanism, Equivalent Income, Percentage Reduction in Gini Coefficients: 1981-82 to 1989-90

	1981-82	82-83	83-84	84-85	85-86	86-87	87-88	88-89	89-90
Social Security	24.0	25.5	26.3	26.9	26.0	25.9	26.2	25.7	25.8
Taxation	14.6	14.1	14.9	15.3	15.8	16.2	12.8	11.5	12.9
Social Wage	13.9	13.6	14.1	15.6	15.6	15.5	15.6	15.2	14.8
Total (Sum)	52.5	53.2	55.3	57.8	57.4	57.6	54.6	52.4	53.5
Total (Final/Private)	44.1	44.8	46.2	47.7	47.4	47.5	45.7	44.2	44.9

consequence of dividend imputation that the tax system and the social wage are on a relative par in reducing inequality. Even in the earlier period, the percentage reduction in the Gini coefficient attendant upon incorporation of the social wage matched that contingent upon the tax system and in 1985-86 in fact exceeded it.

The use of the Okner index also eliminates the apparent increased redistribution of the social security and tax systems at times of higher private income inequality. It reveals that the contribution of social security is more consistent over each year in the period. Table 7.12 indicates that the 'peak' in true redistribution occurred in 1984-85 as far as social security is concerned, in 1986-87 in respect of the tax system and in each of the years from 1984-85 to 1987-88 for the social wage. However, all three mechanisms were apparently less redistributive in the final two years of the period compared to the middle years. In consequence total redistribution, measured either as the sum of the individual redistribution percentages or as the percentage change in the Gini coefficient between private and final income, was greatest in the period between 1984-85 and 1986-87 and least at the two extreme ends, the beginning and end.

Vertical Inequality Within Income Unit Types

In Table 7.13, we examine the analogous proportional reduction in the Gini coefficient contingent upon each form of redistribution **within** each income unit type. Unlike, the earlier section on horizontal inequality this does not look at the inequality impact **between** income units. For Table 7.13 unadjusted income rather than equivalent income is used.

The first point to note is that for all income units ranked on an unadjusted basis (the last set of Table 7.13), whilst the relativities of the contribution of the social security and taxation system are maintained, that of the social wage is reduced dramatically compared to the equivalent basis (Table 7.12). In every year, the tax system appears to reduce inequality by a greater extent than the social wage. The reason for this result can be appreciated by reference back to Tables 5.3 and 5.4 which distribute the social wage and its health and education allocations by unadjusted and equivalent

Table 7.13: Relative Contribution of Redistributive Mechanisms Within Income Unit Types, Proportionate Reduction in Gini Coefficients: 1981-82 to 1989-90

	Year								
	1981-82	82-83	83-84	84-85	85-86	86-87	87-88	88-89	89-90
Single: <25									
Social Security	13.5	16.2	17.4	16.8	15.5	15.7	15.2	13.7	13.4
Taxation	11.8	11.3	11.6	11.7	11.9	12.4	11.8	11.2	13.0
Social Wage	3.9	3.7	4.0	4.4	4.2	4.5	4.5	4.6	4.5
Single: 25-64									
Social Security	18.8	19.7	20.5	20.3	19.8	19.9	19.8	19.3	19.1
Taxation	13.9	14.1	14.7	15.9	16.8	17.0	12.4	10.9	12.1
Social Wage	5.4	5.0	5.3	6.1	6.2	6.2	6.1	5.8	5.8
Single: 65+									
Social Security	70.7	70.3	70.9	71.6	69.4	69.1	69.9	68.5	67.9
Taxation	10.0	10.3	11.3	11.6	13.3	13.4	11.4	11.3	10.7
Social Wage	17.1	16.5	16.6	16.6	17.6	17.8	17.5	18.4	18.5
Couples, no children, <65									
Social Security	12.7	14.3	14.7	15.2	14.6	14.3	14.6	14.1	14.1
Taxation	16.3	16.0	16.3	16.8	17.4	17.6	12.3	9.9	12.7
Social Wage	6.9	6.4	7.1	8.3	8.4	8.3	7.9	7.3	7.6
Couples, no children, 65+									
Social Security	62.9	62.5	63.2	63.7	61.5	60.8	62.2	60.3	59.6
Taxation	12.5	12.5	13.4	14.0	15.0	15.4	11.7	11.5	11.3
Social Wage	17.6	17.1	17.6	18.0	18.4	18.6	18.4	19.1	18.8
Couples with children									
Social Security	8.8	11.7	12.6	12.3	11.7	11.9	12.3	12.3	12.3
Taxation	18.3	18.3	18.8	19.5	19.9	19.9	11.5	8.0	11.4
Social Wage	10.0	11.0	11.6	11.9	11.9	12.4	13.0	12.6	12.0
Sole parent									
Social Security	47.6	50.1	50.9	51.6	50.4	49.8	50.3	49.7	48.7
Taxation	13.8	12.8	14.1	14.9	16.0	17.0	16.1	15.8	15.5
Social Wage	11.5	11.8	11.5	11.2	11.2	11.3	11.0	10.1	10.4
All Income Units									
Social Security	18.5	19.9	20.9	21.6	20.8	20.8	21.2	20.6	20.7
Taxation	12.0	11.8	12.4	12.8	13.4	13.5	10.0	8.8	10.2
Social Wage	4.9	4.8	5.2	5.5	5.6	6.0	6.4	6.3	6.2

disposable income decile respectively. Almost by definition, larger allocations of education are received by large families with greater numbers of school-aged children. Hence, when income units are ranked by unadjusted income almost 64 per cent of education expenditure is received by families in the top three deciles (Table 5.3). However, when income and that expenditure is adjusted via the equivalence scales to reflect differential needs and economies of scale, and income units ranked accordingly then the distribution of education reflects more of a normal curve with a mode in the fifth decile (Table 5.4 and Figure 5.1). In fact, on an unadjusted basis, adding education expenditure to disposable income **increases** apparent inequality. In 1989-90, for example, the Gini coefficient for the distribution of disposable income on an unadjusted basis was 0.374. The Gini for the distribution of disposable income plus education allocation (but not health) increased to 0.381. Conversely, that for the distribution of disposable income plus health (but not including education) **fell** to 0.343 which was lower than the distribution of the combined social wage components of 0.351. Thus, both overall and for those income unit types with children (couples and sole parents), adjusting income and re-ranking income units by equivalent income concepts dramatically increases the apparent progressivity of the education component of the social wage. Therefore, any redistribution revealed in Table 7.13 for the social wage for these two cohorts with children, will be increased on an equivalent income basis.

If we look at these two income unit types first, then for inequality within couples with children, despite the above the social wage is still significant on an unadjusted basis. In fact, with the exception of the 1982-86 period, the social wage contributes more to inequality reduction than the social security system. Up to 1986-87, however, both were exceeded by the taxation system. In fact, during that period, the inequality reduction amongst couples with children attendant upon taxation exceeded the tax rate of any other income unit. However, with dividend income being a significant component source of private income for this cohort (see Appendix Two), the introduction of dividend imputation dramatically reduced the extent of redistribution from taxation from 1987-88 onwards and the relativities vis-à-vis the other mechanisms was reversed.

For sole parents such dividend imputation effects on tax redistribution were much less. However, as may be expected for this cohort the overwhelming contributor to redistribution was the social security (cash payments) system. Thus, whilst the social wage was important in raising relative living standards of this cohort compared to other income unit types (see Section 7.2 above) it was not significant in redistributing amongst sole parents.

Looking at the other income unit types, for single people under 25 and those aged between 25 and 64, the social wage was not nearly as significant as the other two forms of redistribution. For young singles, the social security and taxation impacts were on a par by 1989-90. However, this occurred through a convergence of increased contribution by taxation and decreased contribution by social security after 1982-83 as part-time employment opportunities arose for this cohort. For mid-aged

singles, social security was consistently the principal mechanism of redistribution, although in the 1985-87 period, taxation approached it in significance.

For the elderly, both couples and single, as expected, social security age pension payments overwhelming contributed most to reducing inequality. However, in both cases, social wage expenditure on health was more significant than taxes as a redistributive mechanism.

Finally, inequality amongst childless couples of working age was reduced to a greatest relative extent by taxation over the period of analysis. However, as for couples with children, the impact of dividend imputation in reducing the apparent progressivity of the tax system since 1987-88 saw the steady 14-15 per cent reduction attendant on the social security system become the most significant redistributive mechanism. For this income unit type the social wage played a much less significant role in reducing within-group inequality.

If we examine Table 7.13 across each income unit type, then it is apparent that the social security system is consistently the major inequality-reducing mechanism. However, amongst the elderly in particular and in the later years of the period for couples with children, in particular, the social wage was a significant force in redistributing income within each cohort and exceeded the impact of the tax system. Conversely, for single working-age people and childless couples the taxation system, at least up to 1987-88 was a more significant form of secondary redistribution.

In general, the social security system peaked in its redistributive impact in either 1983-84 or 1984-85 dependent upon the type of income unit but generally maintained its significance. On the other hand, the income tax system was consistently at its most progressive (in terms of maximum reduction in vertical inequality) in 1986-87 immediately prior to the introduction of dividend imputation. Since then, its redistributive outcome has been much reduced, although again the caveat about the exclusion of other base-broadening taxation measures from the current analysis should be noted. The social wage as a vertical redistribution device, on the other hand, increased in significance over the period usually peaking in either 1987-88 or 1988-89 depending on income unit type.

In summary, the relative significance of each of the three redistributive mechanisms considered in reducing inequality within income unit types varies considerably with those types. The cash payment transfers of the social security system have the greatest significance for the aged and sole parents and the least comparative significance for working-aged couples. For those two groups as well as single people aged 25-64 it is the taxation system which for the most part of the period up to 1987-88 was of significance. Reflecting also the implicit priorities of the social security system, the social wage as a redistributive device was greatest for the elderly and to a lesser extent, families with children. Conversely, the social wage had least impact on inequality amongst single people.

Transition Matrix

It is the combination of the impact of the three mechanisms in reducing inequality **between** groups (horizontal inequality, in Section 7.2) and in reducing inequality **within** each group (vertical inequality, discussed above) that produces the overall redistributive outcome of government intervention observable in the changes in inequality from private to final income.

Table 7.14 presents the cross-tabulation transition matrix of those private and final equivalent income levels for the two illustrative reference years of 1989-90 and 1982-83. Table 7.14 shows for each decile of original private equivalent income (down the rows) the percentage of income units who, in outcome after redistribution, end up in each particular decile of equivalent final income. Thus, for instance, for 1989-90, 11.3 per cent of the income units who were in the lowest (first) decile of private equivalent income (and who as we have seen had zero private income) through the combination of social security cash payments, net effect of the taxation system and the provision of social wage benefits in the form of health and school education, ended up at the final equivalent income level in the fifth decile of that distribution. Those income units clearly benefited from the redistribution, effects of such measures in terms of their relative living-standards. As can also be seen, others as a consequence of redistribution, slipped down in terms of their position in the relative ranking.

The 'trace' of the matrix, that is the diagonal linking the first decile of each income concept, and the second decile of private income to the second decile of final income, the third deciles of each concept and so on shows the proportion of income units in each year who, despite redistribution measures, remained in the same relative decile position.

Two aspects are apparent from examination of either the 1989-90 or the 1982-83 redistribution matrix. Firstly, the spread of the 'gainers' across each decile of final income, for each decile of private income is much greater than the spread of the 'losers', that is those who moved downwards from their original private income decile position.

Thus, from the first private income decile some 63.7 per cent moved to a higher income decile. Whilst obviously the same number fell back to the first final income decile, the 'gainers' moved up as far as the eighth final income decile. On the other hand, the 'losers' fell at most from only the fourth original private income decile. The top-right portion of the matrix is far more congested by movement than the bottom-left segment below the trace. This is to be expected where the major redistributive mechanism, as we have seen, social security, and the other, the social wage, are additional income, based on either demographic characteristics or lack of private income. Whereas the other redistributive mechanism, the tax system, generally taxes all income at a rate which never has an effective marginal tax rate in excess of 100 and thus all people move at much the same position in the rankings.

Table 7.14: Transition Matrix of Private and Final Income: 1989-90 and 1982-83

					1989-90					
Private Income Decile	Final Income Decile									
	1	2	3	4	5	6	7	8	9	10
1	36.3	30.5	13.7	4.8	11.3	2.1	1.2	0.2	-	-
2	22.4	27.1	22.9	7.1	14.5	4.1	1.6	0.2	0.1	-
3	24.6	12.4	19.4	21.9	6.0	11.1	4.2	0.2	0.2	-
4	16.6	28.7	19.9	18.2	6.2	4.6	4.4	1.3	0.2	-
5	-	1.2	24.1	38.9	22.8	8.1	1.9	2.5	0.6	-
6	-	-	-	9.2	38.9	37.6	10.7	2.4	1.2	0.1
7	-	-	-	-	0.5	32.3	54.1	10.6	2.1	0.4
8	-	-	-	-	-	0.1	21.9	67.5	9.2	1.4
9	-	-	-	-	-	-	-	15.3	79.6	5.1
10	-	-	-	-	-	-	-	-	7.0	93.0
					1982-83					
1	39.3	31.3	13.0	9.8	4.8	0.8	0.9	0.1	-	-
2	22.6	31.1	21.0	11.1	11.7	0.7	1.5	0.2	-	-
3	24.7	13.5	25.3	17.1	10.5	7.3	1.3	0.1	0.1	-
4	13.3	24.1	26.1	18.9	7.1	6.1	3.5	0.8	0.1	-
5	-	-	14.7	39.3	33.4	8.6	2.5	1.2	0.3	-
6	-	-	-	3.7	32.2	46.5	14.1	2.6	0.8	0.1
7	-	-	-	-	0.2	30.3	56.5	11.2	1.6	0.2
8	-	-	-	-	-	-	19.5	70.4	9.1	1.0
9	-	-	-	-	-	-	-	13.3	82.0	4.7
10	-	-	-	-	-	-	-	-	6.0	94.0

The second general aspect to note from each matrix is the relatively small proportion of income units particularly in the third and fourth deciles who remain on the trace diagonal. In 1989-90, only 19.4 per cent of income units remained in third relative decile at each income level, and only 18.2 per cent in the fourth. It is only for the uppermost four deciles that the trace diagonal indicates that over half of income units remain in the same approximate position. Thus, for the bottom six deciles of income units by private income, redistribution involves a substantive shift in relative living standards to another final decile for the great majority of income units. Clearly, for relative living standards, redistribution measures are extremely significant and it is little wonder that such government measures engender such political reaction.

Such a redistribution matrix can be determined by the simulation for each element of redistribution for each year. However, clearly space does not permit us to compare even two reference years at this more complex individual level although the reader is referred back to Tables 6.8 and 6.9 for the specific impact of the social wage for 1989-90 and 1982-83. Moreover, there are dangers of misinterpretation in that an

individual income unit, like a piece in a game of 'Snakes and Ladders' can move up a decile as a consequence of one form of redistribution, slide down a snake by two deciles for another and then clamber up a ladder through a third form of redistribution. Such individual paths are not able to be tracked on a matrix diagram which only shows net movements.

However, we can briefly compare the overall redistribution matrices for the two reference years as set out in Table 7.14. Aside from the similarities referred to above, the first point of difference relates to greater movement of income units between deciles in the latter year compared to the earlier year. This is most clearly evidenced by the lower proportion of income units who remain on the trace diagonal in 1989-90 compared to 1982-83. For instance, in the third decile of the trace (that is, the intersection of the third private decile and third final decile) in 1982-83, some 25.3 per cent remained after redistribution. In 1989-90 this had fallen to 19.4 per cent, suggesting far greater decile movement in the redistribution process. This occurred in every trace decile and none more so than in the fifth and sixth which fell from 33.4 per cent in 1982-83 to 22.8 per cent in 1989-90, and from 46.5 per cent to 37.6 per cent respectively.

The second notable point relates to the extent of movement (in terms of decile range) from the diagonal. Not only do more income units move from the trace but the further the distance of the movement the more dramatic does the difference become. For instance, comparing the extreme movements from the first decile of original private income of the fifth to eighth final income deciles, in 1982-83, 6.6 per cent of the decile income units moved in this way. By 1989-90, 14.8 per cent of the original decile income units moved in this extreme fashion. A similar result is evident throughout each private income decile.

Both these results confirm that the extent of movement attached to the three redistribution mechanisms was much greater at the end of the period than at the beginning. And if more moved up deciles then more income units also slipped backwards in relative terms although the range extent of such backward movement was not greatly extended. However, with more relative movement involving more people and more dramatic 'gainers' we could well expect that such redistribution would generate greater perceptions about its equity at the end of the 1980s and thus more political concern about such redistributive outcomes and measures. It would be interesting to test this hypothesis against attitudinal surveys conducted at each point in time and any discernible linkage between the extent of actual redistributive movement and attitudes to poverty and inequality. Whilst a number of studies have examined Australians' attitudes to such issues through Australia's involvement with the 1985 and 1987 International Social Survey Program or other national surveys (Papadakis, 1990; Bean, 1991; Smith and Wearing, 1987; Svallfors, 1993; and Saunders and Matheson, 1992), most of these have either been concerned with attitudes at one point in time or in comparison to other nations. Aside from long-term opinion poll data (Smith and Wearing, 1987), we are not aware of studies that have examined the relationship between attitude over time and actual movements in

either inequality or relative redistribution mechanisms. This may well provide an additional beneficial use of the results of the simulation reported upon by allowing survey dates and 'actual' data dates to be tied closer together.

7.4 Decile Share Movements

Perhaps the most direct measure, which brings all these horizontal and vertical inequality influences together, in which the relative contribution of each redistribution mechanism can be observed, is through the changes in the share of equivalent income by each decile as a result of the operation of the social security system, the taxation system and the social wage. This is all the more important given possible ambiguities in interpretation of changes in the Gini measure of inequality. Again it must be remembered that we are considering net transfers with income units re-ranked by each income concept.

To illustrate the overall pattern, we again take 1989-90 as the illustrative year, and in Table 7.15 presents the change in share of equivalent income contingent upon the impact of each transfer mechanism. From Table 7.15, we can see that through the operation of all redistributive mechanisms, the top decile has 8.4 per cent transferred from its share of private income. On the other hand, the second decile increases its share via social security (3.80 per cent), tax (0.83 per cent), and social wage expenditure (0.67 per cent), a total of 5.30 per cent additional to its private income share.

For the first four deciles, as expected from a targeted system, social security was the prime contributor to income share growth. However, note that for the first, third, fourth and fifth deciles the contribution to income share growth of the social wage was at least as great as the gains from the operation of the tax system. This again highlights the contribution the social wage makes to lower income earners. In fact, for the fifth decile **the** prime contributor from all systems was the social wage.

Looked at another way, vertically by each mechanism, we can see that social security made its greatest absolute contribution to income share growth to the second decile. With targeting, only the bottom four deciles gained. In a reverse sense, targeting in the tax system saw only the top three deciles lose with the greatest gain going de facto to the third bottom decile. As reflected in the previous chapter the greatest gain from the social wage allocation goes to the third and fourth deciles. Figure 7.2 highlights these decile impacts in graphic form.

In Table 7.16 we replicate Table 7.15 for the 1982-83 comparison year to ascertain the change in the overall pattern to 1989-90. The pattern of redistribution revealed is not dramatically different, although given that the total combined change in the Gini from all elements of redistribution is much the same at .226 and the proportional change from the private income Gini at 44.8 per cent compared to 44.9 per cent this is hardly surprising.

Table 7.15: Relative Significance of Each Transfer Mechanism to Each Decile of Equivalent Income: 1989-90

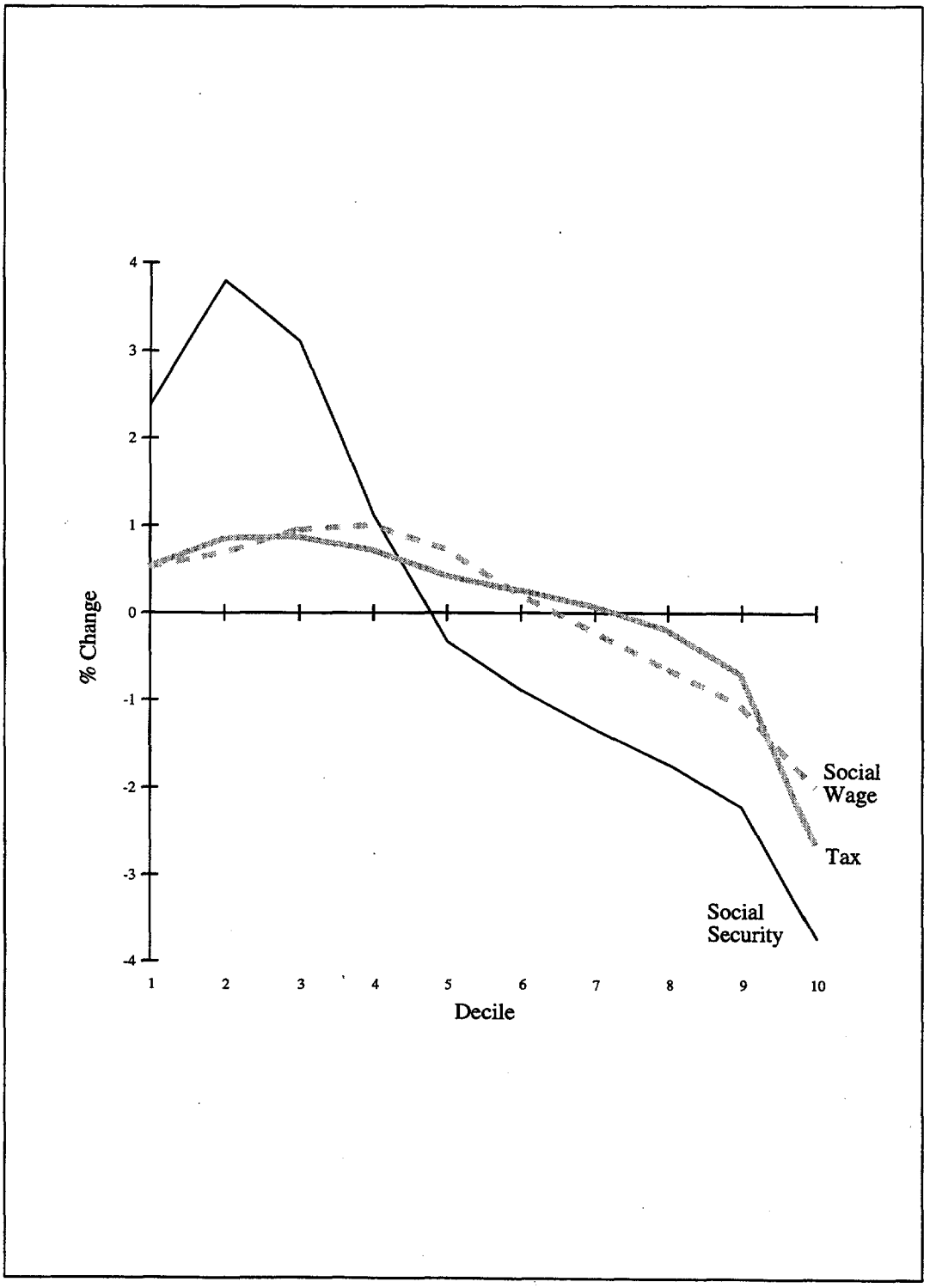
Decile	Social Security	Taxation	Social Wage			TOTAL
			Commonwealth (Budget)	State (Other)	Total	
1	2.38	0.51	0.30	0.21	0.51	3.40
2	3.80	0.83	0.45	0.22	0.67	5.30
3	3.11	0.85	0.67	0.26	0.93	4.89
4	1.10	0.70	0.63	0.35	0.98	2.78
5	-0.32	0.41	0.33	0.38	0.71	0.80
6	-0.89	0.24	0.01	0.18	0.19	-0.46
7	-1.33	0.06	-0.21	-0.02	-0.23	-1.50
8	-1.73	-0.21	-0.42	-0.24	-0.66	-2.60
9	-2.22	-0.72	-0.63	-0.45	-1.08	-4.02
10	-3.73	-2.66	-1.14	-0.87	-2.01	-8.40

Table 7.16: Relative Significance of Each Transfer Mechanism to Each Decile of Equivalent Income: 1982-83

Decile	Social Security	Taxation	Social Wage	Total
1	2.22	0.48	0.50	3.20
2	3.78	0.84	0.63	5.25
3	3.23	0.91	0.87	5.01
4	0.95	0.83	0.88	2.66
5	-0.33	0.56	0.54	0.77
6	-0.86	0.36	0.15	-0.35
7	-1.33	0.09	-0.20	-1.44
8	-1.75	-0.29	-0.56	-2.50
9	-2.25	-0.58	-0.99	-3.82
10	-3.67	-3.29	-1.81	-8.77

Closer analysis of each redistribution mechanism, comparing Tables 7.15 and 7.16, suggests that the redistributive impact of the social wage is greater in 1989-90 for each and every decile. The redistributive impact of the social security system is more mixed. It was stronger in 1989-90 for the first, second, fourth, sixth and tenth deciles but marginally stronger in the other deciles in the earlier year. As far as the taxation system was concerned, with the exception of the impact on the bottom decile and the ninth, the 1982-83 redistributive outcome was greater than in 1989-90. In summary, tax was less significant, the social wage more significant and the social security outcome mixed in 1989-90 compared to 1982-83, as regards to redistribution.

Figure 7.2: Change in Share of Equivalent Income: 1989-90



The benefit of the consistent simulation is that this analysis can be readily replicated for each and every year of the period, and the nature of the changes during the period can be more accurately ascertained. These data are presented by redistribution mechanism in Table 7.17.

As far as social security redistribution is concerned, Table 7.17 indicates that the greatest transfer to the bottom deciles with increased targeting occurred in the last two years of the period, 1988-89 and 1989-90. For the second and third decile this occurred in 1984-85 and a year earlier, 1983-84, for the fourth. Conversely, the greatest relative 'decline' in share of equivalent income with the incorporation of the social security system occurred for the seventh to tenth deciles in the earlier 1984-85 period. Little change occurred across the period in the 'cross-over' deciles of the fifth and sixth.

However, as previous analysis has suggested the greatest decline in equivalent share for the top (tenth) decile, indicative of greatest progressivity of the tax system, occurred in the 1986-87 year prior to the introduction of dividend imputation. This was the culmination of consistently increasing loss for this decile each year from 1981-82. In consequence, for the 1986-87 year also all other deciles 'gained' de facto the greatest increase in their relative share. Conversely, in the final period of dividend imputation, with its benefits concentrated in the top decile, the share of this decile fell least in relative terms with the actual payment of tax. In that situation the relative burden fell more on taxpayers in other deciles so that relative gains for the third to sixth deciles were least in 1988-89 and taxpayers in the seventh equivalent income decile in fact became net losers in relative terms with their income share attendant upon tax falling.

For the social wage, however, changes in both the total amount allocated, its composition between health and education, and the position in relative ranking of income unit types affected to a different extent, resulted in a far more dispersive picture of changing relativities by income share. In general, relative gains to the bottom three deciles were greatest in 1985-86; to the fourth and fifth in 1987-88; to the sixth in 1984-85. On the other hand relative losses due to the incorporation of the social wage were greatest for the seventh to ninth deciles in 1985-86 and 1986-87 years with that for the tenth occurring latest in 1987-88 and 1988-89.

In consequence of all these movements not only does the relative contribution of each redistribution mechanism shift for each decile over time but also so does the total amount of redistribution inherent in the combined change in share by equivalent decile. In respect of the latter the greatest gains (for the bottom five deciles) generally occur mid-period, with 1984-85 being the peak year. On the other hand, the greatest relative 'losses' for the sixth to ninth deciles occur later in 1988-89, with the exception of the top decile which found its share falling most through redistribution in 1986-87 prior to the 'benefits' it received from dividend imputation.

In terms of relative contribution of each redistribution mechanism, the reader is invited to examine Table 7.17 on the basis of proportional percentage of the total

Table 7.17: Contribution to Change in Equivalent Income Decile Share of Each Redistributive Mechanism: 1981-82 to 1989-90

Mechanism/ Decile	Year 1981-82	82-83	83-84	84-85	85-86	86-87	87-88	88-89	89-90
Social Security									
1	2.28	2.22	2.26	2.33	2.31	2.27	2.31	2.37	2.38
2	3.70	3.78	3.86	3.95	3.82	3.82	3.87	3.74	3.80
3	2.82	3.23	3.39	3.43	3.24	3.24	3.32	3.13	3.11
4	0.45	0.95	1.16	1.10	0.99	1.10	1.10	0.91	1.10
5	-0.42	-0.33	-0.29	-0.31	-0.33	-0.29	-0.31	-0.31	-0.32
6	-0.86	-0.86	-0.88	-0.90	-0.89	-0.89	-0.91	-0.90	-0.89
7	-1.22	-1.33	-1.38	-1.41	-1.37	-1.37	-1.40	-1.34	-1.33
8	-1.56	-1.75	-1.86	-1.87	-1.78	-1.79	-1.83	-1.74	-1.73
9	-1.99	-2.25	-2.38	-2.41	-2.28	-2.31	-2.34	-2.24	-2.22
10	-3.21	-3.67	-3.87	-3.92	-3.70	-3.78	-3.81	-3.66	-3.72
Taxation									
1	0.52	0.48	0.51	0.54	0.57	0.56	0.51	0.51	0.51
2	0.89	0.84	0.91	0.93	0.96	0.99	0.84	0.85	0.83
3	0.94	0.91	0.98	0.98	0.99	1.02	0.87	0.84	0.85
4	0.75	0.83	0.87	0.87	0.84	0.88	0.71	0.64	0.70
5	0.52	0.56	0.54	0.55	0.54	0.55	0.39	0.31	0.41
6	0.32	0.36	0.31	0.33	0.35	0.39	0.20	0.10	0.24
7	0.06	0.09	0.05	0.09	0.13	0.14	-0.07	-0.14	0.06
8	-0.20	-0.29	-0.23	-0.15	-0.10	-0.10	-0.30	-0.40	-0.21
9	-0.59	-0.58	-0.59	-0.56	-0.59	-0.59	-0.81	-0.97	-0.72
10	-3.19	-3.29	-3.34	-3.56	-3.77	-3.85	-2.37	-1.81	-2.66
Social Wage									
1	0.53	0.50	0.53	0.56	0.56	0.58	0.56	0.54	0.51
2	0.70	0.63	0.60	0.62	0.65	0.61	0.62	0.67	0.67
3	0.92	0.87	0.87	0.91	0.95	0.93	0.93	0.95	0.92
4	0.87	0.88	0.93	0.97	1.01	1.01	1.02	1.00	0.98
5	0.45	0.54	0.67	0.80	0.75	0.80	0.81	0.77	0.71
6	0.08	0.15	0.20	0.26	0.20	0.21	0.20	0.21	0.19
7	-0.24	-0.20	-0.19	-0.20	-0.25	-0.22	-0.22	-0.23	-0.23
8	-0.59	-0.56	-0.59	-0.67	-0.68	-0.68	-0.67	-0.67	-0.66
9	-0.97	-0.99	-1.07	-1.18	-1.18	-1.18	-1.12	-1.07	-1.08
10	-1.77	-1.81	-1.93	-2.08	-2.01	-2.05	-2.14	-2.14	-2.01
Total									
1	3.33	3.20	3.30	3.43	3.44	3.41	3.38	3.42	3.40
2	5.29	5.25	5.37	5.50	5.43	5.42	5.33	5.26	5.30
3	4.68	5.01	5.24	5.32	5.18	5.19	5.12	4.92	4.88
4	2.07	2.66	2.96	2.94	2.84	2.9	2.83	2.55	2.78
5	0.55	0.77	0.92	1.04	0.96	1.08	0.89	0.77	0.80
6	-0.46	-0.35	-0.37	-0.31	-0.34	-0.29	-0.51	-0.59	-0.46
7	-1.40	-1.44	-1.52	-1.52	-1.49	-1.45	-1.69	-1.71	-1.50
8	-2.35	-2.60	-2.68	-2.69	-2.56	-2.57	-2.80	-2.81	-2.60
9	-3.55	-3.82	-4.04	-4.15	-4.05	-4.08	-4.27	-4.28	-4.02
10	-8.17	-8.77	-9.14	-9.56	-9.48	-9.68	-8.32	-7.61	-8.39

redistribution. Problems of both presentation and interpretation are involved around the 'cross-over' middle deciles, five to seven, where both positive and negative relative gains and losses are recorded. However, for the bottom four deciles where each mechanism contributes an increased relative share and conversely for the top three deciles where there is a consistent decline in relative share from each mechanism, Table 7.18 shows the relative contributions of each mechanism to the gainers and Table 7.19 the corresponding relative contributions annually of social security, tax and social wage to the 'losing' decile.

Looking first at the gainer deciles in Table 7.18, the outstanding feature is the overwhelming dominance, as expected, of social security for the bottom three deciles. However, the other notable aspect is the significance of the social wage. In the first, third and fourth deciles it exceeds the tax system as a relative contributor to decile share increase through redistribution. This is even more so in the last three years of the period. Even for the second decile whilst the minor contributor and less than taxation, it is still substantial. By the fourth decile it rivals even the social security system as the major contributor and in some years actually contributes more than those cash-based payments to the improvement in relative income share of that decile.

Similarly, examination of the loser deciles in Table 7.19, whilst again emphasising the paramount importance of the social security system, also highlights the consistent and substantial contribution of the social wage, as a redistributive mechanism. In all cases it contributes over one-fifth of the total income share 'loss' through government redistribution and in most cases, over one-quarter. It exceeds the relative contribution of the tax system in each year for the eighth and ninth decile. It is only in the top, tenth, decile that the taxation system becomes the more significant contributor and even then not greatly in advance of the social wage which in 1988-89 actually exceeded it. The other point related to the contribution of the social wage is its consistency as an impacting force between each of the deciles. Whereas both the social security and tax system exhibit significant variation in relative contribution between the eighth, ninth and tenth deciles, it remains relatively constant. The other notable feature of both tables is that of the seven deciles examined over each of the nine years, it is only for the top decile in 1985-86 and 1986-87 that the tax system is the dominant contributor to change in the share of the decile and then only marginally in excess of the social security system. The situation rapidly changed after 1986-87, where with the impact of dividend imputation the tax system fell off dramatically as a contributor to vertical redistribution.

For those deciles, the fifth, sixth and seventh, not covered in the two tables because of counteracting forces as they are gainers from the social wage and tax systems but relative losers from the targetting of social security payments, a similar relativity between the social wage and tax system exists (see Table 7.17). Of the relative gains in the fifth decile, the social wage contributes more than the tax system in each year except the earliest 1981-82 and 1982-83. In the sixth decile, it is the tax system

Table 7.18: Relative Contribution of Each Mechanism to Net 'Gainer' Deciles: 1981-82 to 1989-90

Mechanism/ Decile		Year 1981-82	82-83	83-84	84-85	85-86	86-87	87-88	88-89	89-90
1	Social Security	68.5	69.4	68.5	67.9	67.2	66.6	68.3	69.3	70.0
	Tax	15.6	15.0	15.5	15.7	16.5	16.4	15.1	14.9	15.0
	Social Wage	15.9	15.6	16.0	16.3	16.3	17.0	16.6	15.8	15.0
2	Social Security	70.0	72.0	71.9	71.8	70.3	70.5	72.6	71.1	71.7
	Tax	16.8	16.0	16.9	16.9	17.7	18.3	15.8	16.2	15.7
	Social Wage	13.2	12.0	11.2	11.3	12.0	11.2	11.6	12.7	12.6
3	Social Security	60.2	64.5	64.7	64.5	62.5	62.4	64.8	63.6	63.7
	Tax	20.1	18.2	18.7	18.4	19.1	19.7	17.0	17.1	17.4
	Social Wage	19.7	17.4	16.6	17.1	18.3	17.9	18.2	19.3	18.9
4	Social Security	21.7	35.7	39.2	37.4	34.9	36.8	38.9	35.7	39.6
	Tax	36.2	31.2	29.4	29.6	29.6	29.4	25.0	25.1	25.2
	Social Wage	42.0	33.1	31.4	33.0	35.6	33.8	36.1	39.2	35.3

Table 7.19: Relative Contribution of Each Mechanism to Net 'Loser' Deciles: 1981-82 to 1989-90

Decile		1981-82	82-83	83-84	84-85	85-86	86-87	87-88	88-89	89-90
8	Social Security	66.4	67.3	69.4	69.5	69.5	69.6	65.4	61.9	66.5
	Tax	8.5	11.2	8.6	5.6	3.9	3.9	10.7	14.2	8.1
	Social Wage	25.1	21.5	22.0	24.9	26.6	26.5	23.9	23.9	25.4
9	Social Security	56.1	58.9	58.9	58.1	56.3	56.6	54.8	52.3	55.2
	Tax	16.6	15.2	14.6	13.5	14.6	14.5	19.0	22.7	17.9
	Social Wage	27.3	25.9	26.5	28.4	29.1	28.9	26.2	25.0	26.9
10	Social Security	39.3	41.8	42.3	41.0	39.0	39.0	45.8	48.1	44.3
	Tax	39.0	37.5	36.6	37.2	39.8	39.8	28.5	23.8	31.7
	Social Wage	21.7	20.6	21.1	21.8	21.2	21.2	25.7	28.1	24.0

which largely counters the decline in share attendant upon the social security system although in the last three years from 1987-88 onwards the social wage is more dominant. In the seventh decile, as the only 'gaining' force for the decile, the tax system is dominant, with the social wage becoming a 'losing' influence. However, if we consider these in redistributive impact terms so that it is the absolute values rather than the direction or sign that matters then the social wage exerts more influence on this decile than the taxation system. Comparing both influences to the social security system then in this decile as in the sixth it is that cash payment system

that is still the dominant redistributive influence. In the fifth decile, however, the social wage in terms of absolute impact exceeds even the social security system.

In summary, then, Tables 7.17, 7.18 and 7.19 all emphasise the dominant influence of the social security system. However, the tables also highlight the significance of the social wage allocations both as an absolute influence over all deciles and in comparison to the tax system. In fact, whilst the social security is the dominant influence in virtually every decile, in the fifth it is the social wage which predominates and in the fourth the social wage rivals the social security system.

7.5 Conclusion

The conclusion which resulted from the incorporation of the social wage into the analysis was that the social wage, particularly health expenditures, is extremely significant in determining the absolute living standards of low-to-middle income earners (bottom half) and in particular in determining the relative living standards of the third, fourth and fifth deciles, who are particularly vulnerable to private income shifts emanating from the labour market. However, in this chapter we examined the contribution of the social wage as a **relative** instrument of **redistribution** policy in comparison to the social security and taxation systems. The clear conclusion is that whilst social security is the dominant instrument of redistribution, the social wage significantly impacts on horizontal equality between income units, vertical equality within each income unit type and overall vertical equality, amongst all income units, particularly on an equivalent income basis. Moreover, despite appearances and possibly even objectives to the contrary, the social wage arguably is as significant as the personal income tax system, particularly in the light of changes to that system since 1987-88 and, under several criteria examined can be considered as more important as a redistributive device. This is particularly so for the lower-middle ranges of the distribution particularly the third to sixth deciles.

Thus, at one level, governments with a professed commitment to reducing inequality, or enhancing social justice, need to be both aware and careful in the changes that they explicitly make to the social wage system, particularly health, as well as those changes which arise indirectly from expenditure cuts to 'balance' expenditure increases elsewhere in the public sector, or to more generally reduce the government deficit.

At another level, the analysis highlights the imperative of including the social wage in any examination of either absolute or relative living standards or of redistribution mechanisms available to government and their outcome. Limiting analysis merely to either the social security system and/or the taxation system, ignores a substantial aspect by which government does in fact redistribute income. That recognition leads inevitably to the need to examine the quality, scope and timing of the data available to policy-makers and, it may be suggested, the benefit of a properly validated microsimulation approach. Irrespective of this, to ignore the social wage either as a component of living standards or as a contributor to redistribution is likely to produce conclusions which are both misleading and inaccurate.

8 Summary

What then can we conclude about inequality, living standards and the social wage over the 1980s?

Firstly, in respect of money income in the hands of people, a number of points have been made.

Inequality - Private Income

- When account is taken of changes in labour force participation, full- and part-time work, unemployment, average wages, dividends, interest and rents, and age and family composition, private income inequality was greater in 1989-90 than in 1981-82.
- Most of this increase occurred in the recessionary period between 1981-82 and 1982-83, the last year of the Fraser Government (although this should not of itself be taken as indicative of the entire period of the Fraser Government).
- Since 1982-83, private income inequality has followed a cyclical pattern with least inequality from these sources occurring in 1985-86 and 1989-90.
- However, when to this is added trend inequality **within** factor markets - that is, within wages and capital, then the upward trends reflected in the results of the four yearly ABS surveys becomes apparent.
- The net result is a sort of 'ratchet' effect as private income inequality cranks rapidly upward with small periods of slow relative decline.

Inequality - Redistribution

- The interactive operation of the tax social security transfer system was to produce a long upward sloping U-curve reflecting inequality from 1982-83 to 1988-89. That is, through redistribution post-tax income inequality fell from 1982-83 to 1985-86 and then increased to a greater extent to a second peak in 1988-89.
- The decreases in inequality were largely the result of the increase in social security benefits provided by the Labor Government, as reflected in the increased redistributive contribution of direct cash social security payments in the 1983-84 and 1984-85.
- The increase in inequality in the latter part of the 1980s stemmed principally from a reduction in the progressivity of the personal tax system, in particular the introduction of dividend imputation. The caveat to this is the current exclusion from analysis of the broad-base widening measures such as fringe benefits tax and capital gains tax.

Relative Living Standards

- The significant gainers in money terms were the lowest income earners, stemming from pension and benefit increases, and the highest income decile, stemming from dividend imputation. In the latter case this occurred primarily in the last three years of the decade.

- On the other hand, the losers in relative money terms were the lower-middle income recipient families (particularly in the fourth to sixth deciles). These are either single income employed families or dual income families on low or casual/part-time wages, the so-called 'working poor'. These people are particularly susceptible to changes in employment and the distribution of wages. Research by Saunders (1992b) indicates that these groups have also been most adversely affected by unemployment and the recession since 1989-90.

Real Living Standards

- Reflecting the above, whilst real disposable income levels increased on average, the largest increases accrued to pensioners and beneficiaries, and the highest income recipients.

- On a family type basis, the largest increases applied to the elderly (over 65) and sole parents.

- Despite the introduction of the Family Package, gains to couples with children were modest over the period to 1989-90 with the increase only occurring since 1987-88. The caveat to this is that the expenditure boost of the Package really only occurred from 1990-91 onwards, as revealed in the Budget papers.

However, when the social wage expenditure on health and school education is added to this disposable money income, several additional important results should be noted.

Inequality - Redistribution

- Over the period of the Labor Government, the social wage has become more significant as a redistributive device.

- Health expenditure, in particular, is skewed towards the lower end of the distribution and is becoming almost as significant as the income tax system in reducing inequality.

- Commonwealth Government expenditure through the Budget is becoming more redistributive, whereas expenditure by the States is becoming less so.

Living Standards

- The principal beneficiaries of the social wage expenditure are those in the third and fourth deciles.
- Health expenditure has become a significant component of living standards for low-to-middle income families.
- Education expenditure tends to be more evenly spread across the spectrum peaking in the fifth decile.
- The most significant beneficiaries of social wage expenditure are the elderly and those with children.

The conclusions that can therefore be drawn from these results is that over the period of the Labor Government the rich have become richer and indeed the poor (if on pensions and benefits) have become richer. Those who have just held their own or lost out in terms of living standards are the low-to-middle income earners in the third to fifth deciles (either single income or low dual income), unless they have benefited from the targeted Family Package. This group is particularly susceptible to changes in employment in the labour market and has lost out in relative terms in wage inequality changes.

What has kept these families 'just above water' has been the increased expenditure on the social wage, particularly health expenditure, which is particularly important to their living standards. If reduction of inequality and raising of living standards are considered important goals of government, then any policy changes by an incoming government which affects this group's employment, ability to maintain wages in an increasingly decentralised wage system, expenditure on necessities, and, most importantly, health costs need to be very seriously considered.

Whilst the numbers defined as in 'poverty' may or may not have increased, depending on the definition, there is a large group which stands on the precipice. Changes in wage-bargaining relations, and, given its significance, particularly changes in the cost and benefits of the health system, may well push these families off the edge.

The other conclusion from this analysis stems from the nature of the analysis itself, and has two strands. Firstly, the social wage is important in creating a 'true' perspective on changes in living standards and inequality. Reliance on mere cash or money measures will distort our understanding of trends in economic inequality. This is true at both the private/market level where we need to incorporate non-cash fringe benefits and other forms of 'broad' income and also when we come to analyse the redistributive impact of government activity, where we need to incorporate non-cash transfers inherent in the social wage in addition to cash transfers evident from the taxation and social security systems.

Secondly, the determination of inequality on an annual basis as distinct from a reliance on implicit trends between four-year surveys opens up a new realm of research. In particular, the relationship between the business cycle and the impact of economic inequality on both economic and social phenomena which have real economic costs and benefits deserves consideration.

Whilst much work needs to be undertaken before hypotheses can be constructed and tested, the possibility of such interconnections between economic and social phenomena and between distributional and efficiency aspects in our economy has significant implications in the formation of both economic and social policy.

If, as a society, we are concerned with the distribution of economic costs and gains and not just the costs and gains themselves, or if that distribution affects the net quantum of gains, and we are not to perpetuate trends in homelessness, crime, ill-health and social inequality, then it is necessary to develop the appropriate analytical research techniques and tools that provide policy-makers with information on the implications of decisions before and not after the event.

Appendix One: Methodology and Data Sources

The emphasis of the simulation utilised in this paper was less on initially evaluating a proposed policy and more on developing an **annual** simulation of income inequality capable of decomposition by four income concepts: private; gross; disposable and final (incorporating the indirect social wage expenditure benefits), and by type of family units, for each year of the period from 1981-82 through to 1989-90.

As indicated in the body of the paper, the basic building blocks for the simulation are derived from developments at the Social Policy Research Centre over the last three to four years. Indeed, such an annual application of the simulation procedure was only possible by drawing on the Tax and Transfer Library of programs (TATLIB) developed at the SPRC and the previous and on-going work of Bruce Bradbury and Jenny Doyle (Bradbury, Doyle and Whiteford, 1990; Bradbury, 1990; Bradbury and Doyle, 1992). These basic building blocks are documented in Bradbury and Doyle (1992b) and will not be replicated here. However, the process of development of this research is such that new data and techniques for the microsimulation are constantly being modified and improved. This on-going process is reflected in this work and this appendix summarises some of the necessary assumptions and modifications necessary to generate an annual time-series of data on income inequality, as well as the external data sources utilised.

Conceptually, changes in the distribution of income in aggregate can be ascribed to four factors:

- changes in the demographic and socio-demographic characteristics of the population: population, age structure and family composition;
- changes in the economic and socioeconomic characteristics: economic growth, income source and components, labour force participation, structure of employment and extent of unemployment and inflation;
- changes in pension and benefit rates, regulations affecting eligibility, interaction between income tests and private incomes and available deductions in the provision of government cash payments and collection of income tax; and
- changes in the provision of specific items of government expenditure the benefits of which can be ascribed to defined types of individuals and families.

Changes in economic and socioeconomic characteristics contingent upon changes in aspects of economic activity in factor markets interact with changes in demographic and socio-demographic characteristics of the population to determine private income

and its distribution. The direct cash payments by government in the form of benefits and pensions dependent upon administrative arrangements can be imputed and allocated to each socioeconomic unit. In turn, dependent upon the rates and regulations of the tax system, tax liability and disposable income can be imputed. Finally, dependent upon explicit allocation procedures, expenditure in the form of non-cash transfer government activity can be imputed to socioeconomic units. All these can then be aggregated to determine the distribution of this final income.

Procedurally, the incomes at each conceptual level can be updated by the technique outlined below. Taking a specific individual record data set as a base, weights can be adjusted to reflect changes in the demographic and labour market structure of the population as observed from alternative updated sources. Multipliers or inflators derived from external data sources can be applied to the components of private income to reflect changes in the rates of increase of incomes from different sources. The interaction of these weights and inflators provides an updated distribution of private income. To this the tax, social security and social wage imputations can be applied to calculate changes in gross, disposable and 'final' income.

The specific details of this updating (and in this case backdating) procedure are outlined below.

A1.1 Private Income

The base data file used is the 1985-86 Income Distribution Survey. This is then 'backdated' to 1981-82 and 'updated' or 'forward dated' to 1989-90. The 1985-86 survey encompassed 7876 households comprising 9994 income units in the period September to December 1986.

Reweighting

For a given type of income unit in the sample, the population weight reflects both the sample size relative to the population and the prevalence of that type of income unit in the sample compared to its prevalence in the population. With the sample remaining fixed, adjustment of the population weights can reflect changes in the number of each income unit, that is, the total size and distribution of the population across each designated income unit type.

The study designates seven income unit types: young singles (<25); middle-aged single persons (25-64); older single people (65+); couples with dependent children; couples without dependent children; older couples (head age 65+); and sole parents.

These weights are then adjusted to account for the different labour force participation, unemployment and full-time and part-time employment rates of persons within each of the income unit types. Following the methodology adopted by ABS for the 1985-86 data set, the income unit weights are the harmonic mean of the weights belonging to each adult person in the income unit.

The consistent external data source for these reweightings is the ABS series on Labour Force Status and Other Characteristics of Families (ABS, Cat. No. 6224.0). These new sets of weights for each year reflect the applicable demographic and labour market structure in that year.

Income Inflators

Now that the sample can be reweighted to reflect its representativeness of the population at each annual year, the question becomes the determination of the updated private income of each member of that sample.

The appropriate inflator depends upon the type of income received, and that multiplier is used to change incomes from each source. In the case of wage and salary incomes, these were further disaggregated by sex, by full-time or part-time status and by marital status.

Wage and salary incomes dependent upon sex, employment and marital status are adjusted by average weekly earnings data as detailed in the ABS series Weekly Earnings of Employees (Distribution) (ABS, Cat. No. 6310.0), appropriately adjusted for a financial year basis.

Income from self-employment is adjusted using a method based on National Accounts estimates of 'income of farm unincorporated enterprises' and 'income from non-farm unincorporated enterprises', dependent upon the industry of employment of the income recipient (King, 1987). These factors are then adjusted for changes in the relevant population size. However, in view of doubts about the reliability of the base 1985-86 data on self-employment income, compared to other income sources, most of the analysis reported in the paper excludes income units who derived income from this source.

Asset incomes. Income from interest and income from dividends are inflated in the same way as income from self-employment, using the National Accounts measures of 'other interest received' and 'dividends received'. Income from rent is adjusted using the private rental component index of the CPI.

Other incomes, including superannuation and maintenance/alimony are inflated by changes in the CPI.

The summation of these components provides the estimate of private income.

A1.2 Gross Income

Pensions and Benefits. To the estimates of private income are added the imputations of pensions, benefits and education allowances from the TATLIB. This is achieved by inflating or deflating the 1985-86 base by changes in base rates of component pensions and benefits. This does not at this stage directly model most

changes in eligibility conditions or changes in income tests. Take-up rates are assumed to be unchanged from the implicit 1985-86 results.

Family Transfers. The income test for family transfers in the form of Family Allowances, Family Income Supplement and Family Allowance Supplement is explicitly incorporated. Both the Family Income Supplement (FIS, introduced in May 1983) and its replacement the Family Allowance Supplement (FAS), introduced in December 1987) are supplements to the Family Allowance providing assistance on an income-tested basis to low-income families with children. Both schemes are based on voluntary application. Hence, aside from eligibility requirements, it is necessary, for the purposes of annual simulation, to estimate an annual take-up rate.

Pech (1986) estimated that the take-up rate of FIS was almost certainly less than 50 per cent and may have been as low as one-third, using preliminary analysis of the 1981-82 IDS data. Utilising data from the 1986 IDS using current income, Whiteford and Doyle (1991) concluded that overall, 13.6 per cent of eligible families with 17.3 per cent of eligible children were receiving the FIS payments to which they were apparently entitled. They estimated expenditure take-up to be just over 16 per cent for September-December 1986. Brownlee and King (1991) in their modelling work on the impact of the Family Package used two estimates for July 1987 - 25 per cent and 50 per cent - although they claimed the 25 per cent to be 'far more realistic' (Brownlee and King, 1991: 145). Both the Whiteford and Doyle and Brownlee and King studies concluded that the take-up rate of FIS varies with entitlement. Those families entitled to higher levels of FIS took up their entitlements to a greater extent than those eligible for small levels of FIS payment. In their comparison of real disposable income levels between 1983-84 and 1989-90, Bradbury and Doyle (1992), utilising an earlier version of the simulation model used in this study, estimate the FIS take-up at 10 per cent in 1983-84 (its first full year of operation).

In respect of FAS, reflecting their concern for the potential impact of the policy, Brownlee and King (1991) estimated a 100 per cent take-up rate. In their modelling of trends in family disposable incomes up to 1989-90, Bradbury, Doyle and Whiteford (1990) allocated about 58 per cent of estimated FAS entitlements to families in 1989-90 (Whiteford and Doyle, 1991: 20).

Taking the above studies into account, as well as changes in eligibility and outcomes reflected in number of children assisted and outlays (Department of Social Security Annual Reports and Budget Papers) the following estimated overall take-up rates for FIS/FAS used for this study are shown in Table A1.1.

In addition, a further algorithm was applied to reflect variation in take-up rate with level of entitlement. With suitable annual adjustment the base for this, for 1989-90 is shown in Table A1.2.

Table A1.1: Estimated Take-up Rates, FIS and FAS, Percentages: 1981-82 to 1989-90

	FAS	FIS
81-82	0	0
82-83	10	0
83-84	15	0
84-85	15	0
85-86	16	0
86-87	18	0
87-88	25 (July-Dec)	50 (Jan-June)
88-89	0	54
89-90	0	58

Table A1.2: Take-up Rates by Level of Entitlement: 1989-90

Entitlement ($p.a.)	Take-up (%)	Proportion to Mean
>500	5	8.62
500-1000	10	17.24
1000-2000	20	34.48
2000-3000	43.5	75.00
3000-4000	60	103.45
4000-15000	70	120.69
Mean	58	100.00

Sources: Whiteford and Doyle (1991) and Bradbury, Doyle and Whiteford (1991).

These ratios and ranges were proportionally adjusted on the basis of changes in the overall mean and the CPI. Allocation of entitlements to particular families was based on a random probability allocation where the probability was determined by the take-up rate, and the total constrained to the total allocation each year.

A1.3 Disposable Income

Personal income tax is then calculated on the basis of the simulated gross incomes, taking into account the taxable and non-taxable components of pensions, benefits and other income. Some allowance is made for income averaging for farm income. Tax is calculated according to the standard rate scales (including the medicare levy) from TATLIB.

Deductions from gross income (largely reflecting working expenses) to derive taxable income are allocated in accord with the Tax Statistics on mean deductions as a percentage by income category for each year. Family and pensioner/benefit

rebates are explicitly modelled and other rebates are calculated on the basis of Tax Statistics.

The introduction of dividend imputation is explicitly modelled by reference to the proportion of dividend income franked for each year and by level of income.

Dividend Imputation. Prior to financial year 1986-87, dividend income was treated like income from any other source as fully taxable in the hands of dividend recipients. However, as announced in September 1985, to eliminate what was described as the 'double taxation' of income from shares firstly in the form of company tax on profits and again in the form of dividend income received from those profits, dividend imputation was introduced to apply from the 1987-88 tax year. Imputation credits were attached to 'franked' dividends, that is, those effectively paid out of income which has borne tax at the company rate. These credits can be used to offset income tax payable by Australian resident individuals, including that payable on dividend income. In consequence, where the company tax rate equals the relevant marginal income tax rate, such 'franked' dividend income is effectively tax-free in the hands of recipients. All other dividends which are not 'franked' (that is, full company tax has not been paid on them) are treated as assessable income like income from any other source.

The applicable algorithm for these imputation credits is:

$$DC = \left(\frac{c}{1-c} \right) fD$$

where c = the company tax rate
f = the proportion of dividends which are franked.

These calculated imputation credits are, together with actual total dividend income received, added to income from other sources to determine total taxable income from which the Medicare levy is determined, as well as assessed tax liability. However, in determining actual tax paid, as for other rebates, these dividend credits (DC) are then **subtracted** from this assessed tax liability.

Thus, it can be seen that where the corporate tax rate equals the applicable marginal personal tax rate, then the attendant tax liability on franked income equals the dividend imputation credit which is subtracted and hence such 'franked' dividend income becomes effectively tax-free except insofar as the Medicare levy is determined by assessed liability (including DC) and not actual payment liability (excluding DC).

The applicable company tax rate was applied for each year. For the proportion of dividends which were franked each year, reference was made to the *Taxation Statistics* (Commissioner of Taxation, various years).

A1.4 Final Income

Finally the social wage expenditure for each particular year from the Social Wage Data Base is allocated to each income unit on the basis of the characteristics of the persons in the income unit.

Much debate has occurred on what constitutes the social wage expenditure and conceptual difficulties exist as to the appropriate valuation of such benefits (see McHutchison and Urquhart, 1992). To date, the social wage allocated has been expenditure on health and on primary and secondary education. These are unambiguously part of all conceptions of the social wage. This is clearly less comprehensive than the 'Fiscal Incidence' studies by the ABS (1987, 1992) which also incorporate tertiary and higher education, pre-school education, government outlays on social security and welfare programs other than direct cash payments and housing benefits. However, primary and secondary education and health accounted for 68 per cent of the ABS total indirect benefit expenditure for 1984 and 73 per cent for 1988-89, as revealed by ABS (1987) and ABS (1992) respectively. There is clear scope for expansion of the current Social Wage module as more research becomes available which would allow the development of an allocation procedure based on data characteristics of the population held in the original and hence updated data base.

The indirect benefits allocated are valued using the government outlay data produced by the ABS. Following ABS (1987) and (1992) the estimates relate to the total cost to government of outlays of both a current and capital nature, and do not, therefore, necessarily reflect the 'market value' of the benefit, nor the 'recipient value'.

The allocation procedure of this expenditure given the constraints of the initial data base is set out below.

Health Expenditure. Allocation of health expenditure was on a **per capita** basis, adjusted by an age relativities index as determined by the Office of EPAC (1987). In the first step, total health expenditure is divided by the total population to give overall per capita health expenditure. However, health expenditure varies over the life cycle. In the second step, a health expenditure index constructed by EPAC (1987) was utilised to determine relativities by age.

Assuming that the relativities of expenditure by age remained constant in the 1980s, overall per capita expenditure (Step 1) was multiplied by the ratio of per capita expenditure of each age group to the total per capita spending in 1984-85 (Step 2). For example:

- Total health expenditure per head in 1984-85 = $760.
- Health expenditure benefits (per capita) by age in 1984-85 is shown in Table A1.3.

Table A1.3: Health Expenditure Benefits per Capita, by Age: 1984-85

Age	Per Capita Health Expenditure ($)
0-15	310
16-24	370
25-39	430
40-49	490
50-54	710
55-59	780
60-64	1130
65-69	1520
70-74	1960
75+	4170

Source: EPAC, 1987, Table 3: 19.

Now assuming the same pattern by age in all years of the microsimulation, let:

$x = total health expenditure in a given year
n = total population in that year; and
x/n = total per capita health expenditure

then per capita health expenditure for age group 0-15, for example, is found by:

estimated per capita health expenditure (age group 0-15) = 310/760* (x/n)

As a check to constrain allocation to total expenditure, per capita spending by age group was multiplied by the population in the age group and summed. The discrepancy between the total expenditure minus the sum of allocations was noted. The shortfall was allocated by multiplying each estimate of per capita health spending by age group by total health expenditure over the sum of allocations for that particular year.

After all health expenditure has been allocated, the health component of the social wage was allocated to income units by the age of each member of the income unit.

Data Source for Total Health Expenditure

- ABS Series: *Commonwealth Government Finance, Australia* (various years, ABS, Cat. No. 5502.0); *State and Local Government Finance, Australia* (various years; ABS, Cat. No. 5504.0); and *Government Finance Statistics, Australia* (1989-90, ABS, Cat. No. 5512.0). These show a breakdown of

current and capital expenditure by the Commonwealth Government and State and local government.

- Budget Paper Series: *Commonwealth Budget Paper No. 1* (various years). This shows Commonwealth total outlays only.

Education Expenditure. Allocation of school expenditure was on a **mean average per school age** child basis. Aggregate primary and secondary school expenditure was divided by the total number of students for the year. The education component of the social wage was allocated to all school age dependent children aged 5 to 17 year old (18 year olds are not identified on the base 1985-86 income unit data tape). Thus an income unit with two children received two lots of the estimated spending per school student. Tertiary spending has not yet been allocated.

Data Source for Total Education Expenditure:

- ABS Series: *Commonwealth Government Finance, Australia* (various years, ABS, Cat. No. 5502.0); *State and Local Government Finance, Australia* (various years, ABS, Cat. No. 5504.0); and *Government Finance Statistics, Australia* (1989-90, ABS, Cat. No. 5512.0). These show a breakdown of current and capital expenditure, for Primary, Secondary, Tertiary and Other, at the Commonwealth, State and local levels of government. These figures were verified by reference to *Expenditure on Education, Australia* (various years, ABS, Cat. No. 5510.0).

- Budget Paper Series: *Commonwealth Budget Paper No. 1* (various years). This shows Commonwealth outlays only, with a breakdown for Primary, Secondary, Tertiary and Other.

- Student Numbers: *Schools, National Schools Statistics Collection* (various years, ABS, Cat. No. 4202.0); *Government Schools Australia, National Schools Statistics Collection* (various years, ABS, Cat. No. 4215.0); *Non-Government Schools Australia, National Schools Statistics Collection* (various years, ABS, Cat. No. 4216.0); *Schools Australia* (ABS, Cat. No. 4221.0). Students of special schools (less than 1 per cent of the total), and pre-school children (if catered for within a primary or secondary school) were both included. Adult and part-time students were excluded as far as possible. School student data was available for calendar years. To obtain financial year estimates an average was taken of the two corresponding calendar years.

It should be noted that the Social Wage Data Base provides two sets of data: ABS data which covers all levels of government and Commonwealth Budget data which is more readily accessible with less time lags to publication relating to the Commonwealth Government expenditure only. The use of the former enables coverage of the entire government sector outlays for social wage expenditure inclusions, whereas the latter, given Commonwealth responsibility for taxation and

direct social security transfers enables examination of the redistributional impact of the Federal budget.

A1.5 Improvements

The outline of the procedural methodology in the previous section clearly highlights several areas in which the simulation can be improved.

In terms of coverage, the social wage module could be expanded to incorporate initially other non-ambiguous forms of social expenditure and, in conjunction with other research, extended to examine the characteristics of beneficiaries of other forms of government expenditure including taxation expenditures. In light of more data available on utilisation rates, the allocation procedures for social wage imputations could be improved. More direct imputation of income tests applicable in the social security system could be achieved to take account of changes in eligibility criteria and administrative arrangements more explicitly. Similarly the model would benefit by integration with an expenditure-based model to enable the consistent determination of the distribution of indirect expenditure taxes. The incorporation of other components reflecting wealth and industry status could also enable more accurate determination of the distribution of other forms of taxation such as capital gains and company taxation.

In that regard, work being conducted elsewhere within the Study of Social and Economic Inequality, on employee benefits (Raskall, 1991 and forthcoming), will enable the 'overlaying' of these benefits onto cash private income with a concomitant component module for fringe-benefit taxation. Given the increasing significance of this form of remuneration and particularly in regard to superannuation entitlements, such a module would enhance understanding of the distribution of remuneration rather than mere cash earnings.

As it stands, conceptually, the model at least is capable of reflecting shifts and differential change in the component sources of income. However, it does not reflect changes in the distribution of factor market income. That is, in general, wages of all are assumed to increase at the same rate, save for recognition of differences between labour force status type (full- and part-time). This is clearly a restricting assumption when other data (King et al., 1991; Gregory, 1993; and Raskall, 1993) reveals that the distribution of wage income even amongst full-time workers of the same sex increased significantly over the 1980s. In fact, this has been a consistent trend since at least 1975.

An attempt has been made to incorporate this increased inequality within the labour market by taking as inflators the relevant change in the wages of the mid-quintile level. That is, wages of the bottom 20 per cent of wage-earners ranked by wages received, are inflated by the increase of the 10th percentile. However, this to date has not proved successful in that the revealed changes in wage inequality are far less than that revealed by ABS wage data. The level is still too aggregated. The

consequence is that the private income simulation of the model is likely to underestimate the actual changes in inequality over the period of analysis.

Similarly, in respect of asset incomes, the implicit assumption is that the pattern and distribution of receipt of income from these sources is unchanged except as a reflection of those factors incorporated in the reweighting. Thus, the changes in the receipt of dividend and interest income are unchanged, with all recipients receiving the same factor reflation with no change in the numbers in receipt (that is share-owners) except insofar as this is reflected by shifts in demographic and family composition. Related to this, a further limitation exists in the 'institutionalisation' of original levels of tax evasion and avoidance. To the extent that the base data set (1985-86) encompasses both under-reporting or reflects evasion or avoidance or otherwise artificially contrives to reduce the true level of income received, then all subsequent backdated and updated simulations will retain this. To the extent that policy changes or community attitudes change the extent of this artificial minimisation of income then the resultant simulations will depart from the actual distributions. This problem is particularly significant in respect of self-employed income and asset income.

Over-riding the above, is the need to expand the simulation beyond the static analytical phase to incorporate at least first- and second-round behavioural responses. This is particularly important if the process of inequality and its regeneration is to be more properly understood. Inequality is not merely an outcome of economic activity and interaction but may itself be a cause of changes in economic activity and social condition. It is only when the interactiveness of this process is understood that the true effectiveness of policies in redistributing income can be properly considered. Indeed, one of the aims of the time series simulation exercise is to produce an array of annual data which can be examined in relation to other economic and socio-demographic phenomena. Perkins (1989) has utilised an NIEIR simulation through static backdating and updating of the 1984 HES data to produce a 20-year annual series of household expenditure distributions. This estimated output was then used as a basis for examining the contributions of changing demography and income distribution to observed changes in aggregate consumption over the period. The use of simulated data in this way can open up an array of research opportunities.

Appendix Two: Validation

The ultimate test of any microsimulation which attempts to provide an annual estimate of income distribution must be its ability to replicate the results of an actual survey in a particular year. During the 1980s, the ABS conducted three income surveys relating to the years 1981-82, 1985-86 and 1989-90, and two household expenditure surveys for 1984 and 1988-90. However, prior to undertaking such a validation exercise a note of caution needs to made.

The simulation exercise assumes that the same methodology and scope as were utilised for the base year (in this case 1985-86) were also used for each other survey; that is, in fact, one of the strengths of the microsimulation approach. However, actual survey definitions, and coverage, whilst broadly similar, in fact do vary. The 1981-82 survey, for instance, recorded all negative incomes as zero whereas these were specifically recorded in 1985-86 and 1989-90.

Moreover, the methodology used for the income surveys differs significantly from that of the expenditure surveys. In part, that is to be expected given that the collection of income data is not the major goal of the expenditure survey and is merely collected as an ancillary data item. Even within the two household expenditure surveys significant differences in conceptual definition and methodology occur such that for the latter survey, to facilitate comparability the ABS provided a separate table to produce the 1988-89 estimates using as near as practicable the methods used to produce the 1984 estimates. The differences between the two 1988-89 results outlined in Tables 1 and 34 of ABS (1992) are striking. This is the only occasion where ABS has done this comparative recalibration.

For all concepts of income the estimated Gini coefficient from the decile shares is less when the 1988-89 estimates are re-calibrated to the methodological base of the 1984 survey than under the definitions and procedures of the 1988-89 survey. This is particularly so for the share of the bottom ten per cent. Similarly the implied aggregate values of incomes are substantially less under the 1988-89 methodological base than the calibration of the same data under the 1984 base. Thus, even if we were able to 'perfectly' simulate the 1988-89 survey results using the 1984 HES as a base, the resultant estimates obtained would be dramatically different from the apparent actual results of the 1988-89 survey. The corollary of this is that simple comparison of the 1988-89 published results with the 1984 results overstates the true extent of the apparent increase in inequality amongst households. Although less dramatic, similar misinterpretations of simple comparisons due to changes in survey definitions and scope can affect the explicit income surveys.

The point is that the results of a survey are based on a sample, not a Census, and are thus dependent upon the sample size and its representativeness of the population and the conceptual and operational methodology and definitions used to compile the responses. It is also dependent upon the quality of the responses received from

participants, in particular, the under-reporting of certain incomes and related reluctance to disclose activities of tax evasion and avoidance. This particularly afflicts the quality of data from self-employed people. Anti-evasion and avoidance measures undertaken by the government and the activities of the Tax Office over the past decade can alter the comprehensivity and reliability of data of different income sources.

Finally, it needs to be recalled that the Income Survey is not a universal (complete) coverage of the Australian population. It only relates to the non-institutional population and excludes persons in 'hospitals and sanatoria'. This means that the number of aged persons in particular is under-represented by about 10 per cent.

Bradbury and Doyle (1992: 69-85) provide a valuable comparison of the 1985-86 income survey with other external data sources which highlights the differences between the base survey for the simulation and other population, labour force and income aggregates.

That said, however, a simulation exercise using data from external sources and taking an existing income survey as a base should be able to provide a reasonably close approximation to the results produced by an actual survey conducted at another point in time within the period of analysis. The simulation should also bear reasonable consistency with other external aggregates such that the relative relationship remains broadly similar or any difference can be explained.

Conceptually, as has been noted earlier, the microsimulation attempted here by its current methodology excludes changes in the distribution within each factor market and thus changes in the distribution of private income within each source of income except for that reflected by the disaggregation of the labour market by sex, marital and labour status. Other partial external data (taxation statistics and wage statistics) suggests that inequality within these factor markets increased over the 1980s (Raskall, 1993). In consequence, a priori, we would expect the simulation to underestimate the apparent overall inequality in private income distribution in earlier years and overestimate it slightly in later years.

Because of the volatility of self-employed income and the questionable quality of the income data of self-employed people in the surveys, the validation has been undertaken in the first instance excluding those income units where one of the members was self-employed at any stage during the year. However, some results are presented for all income units. Additionally, because of differential treatment of negative incomes from, say, business losses and the unreliable and volatile nature of such, as well as differential treatment across the benchmark surveys, all negative private incomes have been recoded as zero incomes.

Since the simulation does utilise imputations as well as external data sources, it was also thought important to examine the degree to which the base year simulation is able to replicate itself, that is, the extent to which the simulated results for 1985-86 reflect the actual 1985-86 results. As could be gathered, we would expect this calibration to produce a high level of correspondence.

Validation of the simulation should proceed along two different sets of parameters: aggregate income variables and distributional outcomes.

A2.1 Aggregate Variables

The aggregates derived from the simulation model in respect of the various concepts of income - private or market, gross and disposable - and total social security and direct taxation can be compared with a number of external sources, in particular the National Accounts, the Taxation Statistics and the various income surveys. In addition, those elements of the social wage we have incorporated can be validated, in aggregate, with the results of the HES 'fiscal incidence studies' (ABS, 1987 and 1992).

These aggregates reflect two aspects: the mean levels of each variable as well as the demographic simulation - that is, the capacity of the model to accurately forecast demographic trends in the population covered as well as their income unit composition. Thus, in comparing the simulation to these external sources it is important to recognise that those sources may differ from the 'actual' situation. For instance, the Tax Statistics relate to returns lodged in a particular year, not necessarily income received in that year or even tax paid on that income received. Similarly, the National Accounts are subject to substantial revision and adjustment even several years after their initial publication. Finally, the Income Surveys themselves, aside from sampling errors and methodological differences, have population weights attached which may differ from other sources including the Labour Force Status of Families series (ABS, Catalogue No. 6224.0) used in the simulation (see Harding, 1993, in respect of the 1989-90 survey).

It must be remembered that the exercise of the simulation is **not** to reproduce exactly the income surveys but to provide a **consistent** set of inequality measures over time which accord reasonably with the results of the actual surveys undertaken.

Income Surveys (1981-82; 1985-86; 1989-90)

Unadjusted Income. In Table A2.1 the comparative aggregates for the actual survey and the simulation are produced for each of the years available for the non-self-employed population of income units, as defined in the text. In addition, the mean income for each income concept for each year is also presented. In Table A2.2, the analogous comparison is provided for the all-income unit population including self-employed.

Looking at the 1981-82 results from Table A2.1 it can be seen that the simulation aggregates exceed the actual 1981-82 survey aggregates for each concept by between 3.20 and 5.49 per cent. For the population estimate, the simulation estimate (derived from the Labour Force Survey estimate) understates the population derived from the

Table A2.1: Aggregate Comparison of Simulation with Income Surveys, Non-self-employed Population: 1981-82, 1985-86 and 1989-90 (Survey Years)

	1981-82			1985-86			1989-90		
	Simulation (S_1)	Survey (S_2)	S_1/S_2 (%)	Simulation (S_1)	Survey (S_2)	S_1/S_2 (%)	Simulation (S_1)	Survey (S_2)	S_1/S_2 (%)
Total ($b)									
Private	76.2	72.3	105	108.5	109.7	99	159.3	169.6	94
Gross	84.5	81.1	104	122.2	122.0	100	179.2	187.9	95
Disposable	67.8	65.7	103	96.8	96.0	101	146.4	148.7	98
Direct Benefits	8.2	8.9	93	13.7	12.2	111	19.9	18.3	108
Direct Tax	16.7	15.4	108	25.4	26.0	98	32.8	39.3	84
Population ('000)	5600.4	5701.1	98	6029.7	6029.7	100	6495.6	6679.4	97
Mean									
Private	13612	12676	107	17996	18196	99	24529	25389	97
Gross	15083	14233	106	20265	20233	100	27588	28136	98
Disposable	12108	11525	105	16058	15925	101	22542	22258	101
Direct Benefits	1471	1557	95	2269	2037	111	3059	2747	111
Direct Tax	2975	2708	110	4207	4308	98	5046	5878	86

Table A2.2: Aggregate Comparison of Simulation with Income Surveys, Total Population: Survey Years

	1981-82			1985-86			1989-90		
	Simulation (S_1)	Survey (S_2)	S_1/S_2 (%)	Simulation (S_1)	Survey (S_2)	S_1/S_2 (%)	Simulation (S_1)	Survey (S_2)	S_1/S_2 (%)
Total ($b)									
Private	96.5	93.1	104	134.1	135.5	99	200.5	208.0	96
Gross	105.2	102.5	103	148.5	148.3	100	221.6	227.0	98
Disposable	83.8	82.0	102	117.0	115.8	101	180.3	177.9	101
Direct Benefits	8.7	9.4	92	14.4	12.8	113	21.2	19.1	111
Direct Tax	21.4	20.5	104	31.5	32.4	97	41.3	49.2	84
Population ('000)	6544.7	6633.4	99	7034.1	7034.1	100	7656.0	7672.7	100
Mean ($)									
Private	14750	14032	105	19059	19257	99	26185	27104	97
Gross	16080	15454	104	21113	21081	100	28950	29591	98
Disposable	12806	12354	104	16637	16469	101	23556	23184	102
Direct Benefits	1330	1422	94	2054	1824	113	2765	2487	111
Direct Tax	3274	3100	106	4476	4612	97	5394	6407	84

IDS weightings by 1.77 per cent, such that the mean income differences are even larger (ranging from 5.06 per cent for disposable income per non-self-employed income unit to 7.38 per cent for private).

The explanation for this probably lies at the private income level where, as was indicated previously, the simulation may not adequately reflect the changes in the distribution within factor incomes. The period between 1981-82 and 1985-86 was somewhat turbulent in that it encompassed a period of virtually unregulated wage determination, a period of severe recession, dramatically changing participation rates and a period of strongly centralised wage determination. In consequence, it would appear that taking 1985-86 as the base and backdating using mean annual wages may have resulted in an overestimation of wage incomes. This is compounded by the demographic differences in weightings such that the simulation over-estimated the number of couples compared to the actual 1981-82 survey by about 3.84 per cent, but underestimated the number of single people by about 6.12 per cent. Following on from this overestimate of private income the simulation thus overestimates the aggregate of direct tax and in turn underestimates the total direct government cash benefits paid.

For 1985-86, by definition, the demographics of the simulation match the actual survey, hence the differences in the aggregates relate through the means to the differences between the imputations of the simulation and the survey. The net results for the aggregates of private, gross and disposable are thus very close. However, examination of the simulated and actual levels of direct benefits suggests that the imputed allocation of benefits exceeds the survey-revealed apparent actual by about 11.39 per cent. This could be explained by differences in the take-up rate of voluntary benefits such as family allowances as discussed in Appendix One. The consequence, given the taxation modules, is a slight underestimate of the direct tax obligations. In total, though, these counteract one another so that the disposable income levels are a very close approximation with less than one per cent difference.

Estimates for 1989-90, based on the final revised tape released by ABS in March 1993, indicate a similar result to the 1985-86 comparison. The simulation underestimates the total private income by about 3.39 per cent on average compared to that revealed by the actual survey. However, after application of the social security and taxation imputations the net disposable income level is a close approximation of the revealed survey result. As in 1985-86, this occurs as a result of overestimation of direct social security benefits by the model and underestimation of direct tax liabilities.

The explanation of the private income difference could come from unincorporated changes in the distribution within factor incomes or from differences in the population weightings adopted by the ABS for the 1989-90 survey and those derived for the simulation from the ABS Labour Force series (ABS, Cat. No. 6224.0; see Harding and Mitchell, 1993).

In respect of the former, Raskall, McHutchison and Urquhart (forthcoming) note the significance of, and specific transfers in, income from capital and, in particular,

dividend income in the latter part of the 1980s, such that on decomposition analysis by source of income, capital income change contributed overwhelmingly to the change in total inequality. This could be reflected in within capital-factor income inequalities which to date may not be adequately reflected in the simulation.

As far as the population weightings are concerned, it must be stated that there is significant disquiet with the apparent weightings used by the ABS, particularly when examined by income unit type. Overall, the revised total income units from the 1989-90 tape of 7,672,708 accords reasonably closely with the 7,655,984 obtained, as for the simulation, by taking the July 1989 totals derived from the Labour Force Survey data set (ABS, Cat. No. 6224.0).

However, the composition by income unit type is dramatically and significantly different. Compared to the Labour Force data, the 1989-90 IDS data for non-self-employed underestimates the number of single person income units aged under 25, by almost 15 per cent. Conversely, it overestimates all the other income unit types - notably, sole parents by 18.8 per cent, single aged (over 65) people by 5.3 per cent and couples (aged under 65) without children by almost 10 per cent.

Of course, it may be that the ABS 1989-90 IDS weightings are the more correct set. However, as Table A2.3 demonstrates the simulation set produces a series which both reflects independently observed demographic trends such as fewer marriages, less and later children, more aged and gradually increasing sole parenthood, but more importantly produces results similar to the 1981-82 actual IDS. On the other hand, the 1989-90 IDS stands out like the proverbial 'sore thumb', with a dramatic rise in sole parenthood, couples without children and conversely a dramatic fall in 1989-90 in younger single people. The result is a feeling of some disquiet, which can only be resolved when the 1991 Census results are fully available. Given that younger single people have one of the lower private mean incomes relative to the total income unit population, and couples without children one of the highest, this weighting difference could explain the apparent underestimate by the simulation (see Harding, 1993)

Equivalent Income. One method of reducing the impact of demographic influences is to use incomes adjusted by an equivalence scale which takes into account household size and composition.

In Table A2.4, the comparison of the results from the simulation and from the survey are presented for mean and median equivalent income based on the OECD equivalence scale.[4] The population, here, has been constrained to exclude self-employed income units. This is the concept, and the population, that is utilised in the main body of the paper.

---

4 For this scale, for first adult in an income unit is given a value of 1.00, other adults a value 0.50 and all dependents a value of 0.40 (OECD, 1982).

Table A2.3: Comparison of Simulation with Surveys, Composition of All Income Units, Percentages: 1981-82 to 1989-90 (For Simulations) and Survey Years

	Income Unit Type							
		Single		Couples without children				
Year	<25	25-64	65+	<65	65+	Couples with children	Sole parent	Total
Simulation:								
81-82	17.2	17.7	8.5	17.1	7.0	29.0	3.5	100.0
82-83	17.6	18.1	8.6	16.7	7.0	28.4	3.6	100.0
83-84	17.9	18.5	8.8	16.3	6.9	27.9	3.8	100.0
84-85	17.5	18.6	9.0	16.5	7.1	27.6	3.7	100.0
85-86	17.6	18.8	9.0	16.7	7.2	27.0	3.7	100.0
86-87	17.8	19.0	9.0	16.6	7.1	26.6	4.0	100.0
87-88	17.3	19.0	9.1	16.7	7.2	26.8	3.8	100.0
88-89	17.3	19.4	9.2	17.0	7.4	26.1	3.6	100.0
89-90	17.4	19.2	9.1	17.1	7.4	26.0	3.9	100.0
Survey:								
81-82	17.6	18.2	9.2	16.2	6.6	28.5	3.9	100.0
85-86	17.6	18.8	9.0	16.7	7.2	27.0	3.7	100.0
89-90	14.8	19.7	9.4	17.8	7.6	26.2	4.5	100.0

Table A2.4: Comparison of Simulation with Surveys, Equivalent Income, Non-self-employed Population: Survey Years

	Mean			Median		
Survey/Concept	Simulation S_1	Survey S_2	S_1/S_2 (%)	Simulated S_1	Survey S_2	S_1/S_2 (%)
1981-82						
Private	8248	7980	103.36	7420	7364	100.76
Gross	9289	9099	102.09	7748	7708	100.52
Disposable	7534	7417	101.58	6594	6537	100.87
Social Security	1041	1119	93.03	328	344	95.35
Tax	1755	1682	104.34	1154	1171	98.55
1985-86						
Private	11266	11222	100.39	9937	9914	100.23
Gross	12882	12848	100.26	10515	10490	100.24
Disposable	10305	10210	100.93	8878	8778	101.14
Social Security	1616	1626	99.38	578	576	100.35
Tax	2577	2638	97.59	1637	1712	95.62
1989-90						
Private	15496	15721	98.57	13670	13462	101.55
Gross	17674	17697	99.87	14405	14079	102.32
Disposable	14477	14133	102.43	12261	11895	103.08
Social Security	2178	1976	110.22	735	617	119.12
Tax	3197	3564	89.70	2144	2184	98.17

As can be observed, the use of equivalent income improves the correspondence of the simulation of overall mean income for each of the concepts of income, as well as the specific imputations of social security cash payments and income tax, to the raw unadjusted means of Table A2.1.

Of particular note is the improvement in the estimate of 1989-90 mean direct tax. This suggests that the apparent inconsistency of the raw figures is at least in part related to the demographic composition of income units. However, a still substantial 10 per cent difference occurs in mean equivalent income terms.

This suggests that a substantial proportion of the residual error factor in the microsimulation occurs in the demographic modelling component, or more particularly, differences between the survey results and the source data for the microsimulation.

Given the emphasis of the model for distribution work, the close parallel between the simulated and the actual results for the median is encouraging. In fact, overall the results for each of the income concepts are remarkably good, with the 'worst' outcome being a difference of 3.36 per cent for private income in 1981-82.

Comparison by Income Unit Type. Aside from the use of the equivalent income concept, the demographic aspects can be substantially removed by comparing the mean income levels revealed by the simulation for each income unit type with the unadjusted levels revealed by the three surveys. The relative percentage of the simulation result to survey result is presented in Table A2.5 for each of the seven designated income unit types for each income concept from private income to disposable income.

In 1981-82, it can be seen that the simulation overestimates the mean private income of couples under 65, both with and without children, and middle-aged single person income units. These income unit types have the highest relative mean incomes of all types. Conversely, the simulation underestimates the private income of those with the lowest relative mean incomes: single people and couples over 65, and young single people. This disparity at the private income level is maintained through the social security and taxation imputations, though reduced, at the gross and disposable income concepts. The net consequence of underestimating the mean incomes of the lowest income earners and overestimating those of the highest private earners by income unit types leads to resultant overestimate of private overall mean income (as noted in Table A2.1) and would lead to an overestimate of private income inequality.

One explanation of this comes from the decomposition analyses of inequality change in the 1980s by Raskall, McHutchison and Urquhart (forthcoming). This indicates that the principal contributor to inequality change was change in the distribution of dividend income. This is traced to an apparent transfer of shares from the elderly to couples after 1981-82 and prior to the 1985-86 income survey. Since this microsimulation takes 1985-86 private income distribution as its base and forecasts both forward to 1989-90 and back to 1981-82, then such a share transfer would not

Table A2.5: Comparison of Simulation with Surveys, Mean Income Levels by Income Unit Type (Simulation/Survey (%); Non-equivalent Income; Non-self-employed Population): Survey Years

	Private	Gross	Disposable
1981-82			
Single <25	90.84	92.14	93.30
Single 25-64	102.84	102.32	101.84
Single 65+	92.05	90.22	93.49
Couples without children, <65	106.55	106.15	105.10
Couples without children, 65+	93.77	92.79	96.33
Couples with children	110.12	109.53	107.72
Sole Parent	99.72	97.89	97.76
All	107.38	105.97	105.06
1985-86			
Single <25	98.93	100.00	99.64
Single 25-64	98.85	100.02	100.09
Single 65+	98.95	100.69	103.50
Couples without children, <65	99.37	100.02	100.43
Couples without children, 65+	99.09	101.26	104.84
Coules with children	98.90	100.12	100.62
Sole Parent	97.99	100.42	104.02
All	98.90	100.16	100.84
1989-90			
Single <25	99.29	100.47	101.02
Single 25-64	105.19	105.18	105.51
Single 65+	86.03	98.62	101.39
Couples without children, <65	97.72	98.90	99.45
Couples without children, 65+	77.25	92.60	95.46
Couples with children	97.90	98.74	99.57
Sole Parent	110.89	111.64	110.57
All	96.96	98.26	101.28

have been incorporated and as a consequence would lead to result obtained for 1981-82: underestimating private mean income of the elderly and overestimating it for couples. Credence to such an explanation is given by the fact that the 1989-90 simulation estimates of mean private income for couples are very close (at 98 per cent) to the revealed survey estimates.

For 1985-86, as expected, the simulation provides a close replication of the survey for each income unit type. The taxation imputation, however, does appear to underestimate survey-revealed tax liabilities, and hence overestimate mean disposable income for aged people and sole parents. These income unit types are most dependent upon social security benefits which would suggest the possibilities that beneficiaries might overstate such tax liabilities in the survey or that more work should be undertaken on the taxation imputation of the simulation to reflect beneficiary rebates. Irrespective, the net result at the disposable income level is at

worst out by 4.84 per cent for aged couples and for most income unit types is extremely accurate.

For 1989-90, the simulation when disaggregated to income unit type is remarkably good particularly in replicating the disposable income levels revealed in the survey. It is least satisfactory in replicating the results for sole parents and single people aged 25-64, where in both cases, it overestimates survey-revealed income for all income concepts from private through to disposable. One explanation for this is the changing nature of the labour market with the increased prevalence of casual work, or an increased disparity in the distribution of hours (particularly part-time) worked. It is in this context that single people and sole parents may be most affected. Nevile and Van Tram (1992) suggest that a wage premium exists for married men in the labour market, possibly reflecting higher employment stability. Single people and sole parents may be far more 'mobile' in terms of their within-year participation in the labour market, remembering that the simulation is based on the labour force survey at one point in time during the year. This again suggests the need to examine labour force dynamics and the within-factor distribution of wage changes in more detail.

The other less than satisfactory aspect of the microsimulation is its capacity to replicate the mean private income of aged people in 1989-90. For both aged couples and single people the simulation underestimates their private income when compared to the survey. However, in both cases, the interaction of the social security and taxation imputations substantially removes this disparity in estimating the disposable income level. Again, one possible explanation for the apparent private income disparity could be found by within-factor income changes (in this case, capital income). Just as the share transfers of the elderly reflected in the 1981-82 figures above were not adequately incorporated in the simulation, and given their precise date, after the 1984 HES and before the 1985-86 IDS (see Raskall, McHutchison and Urquhart, forthcoming), were possibly in response to perceptions regarding the introduction of the assets test on pensions, so the 1989-90 disparity can be explained. In the post-1985 deregulated financial environment, and with the assets test imputing an income to cash investments, many financial institutions introduced 'pensioner accounts' which provided a return commensurate to the imputed rate. This meant that many pensioners transferred their cash-holding out of previously non-income returning accounts. As a result, it could be expected that their capital income increased at a rate greater than the community-average which is the basis of the simulation (see Appendix One). Hence the simulation, as it presently stands, underestimated their nominal private income growth. The accuracy of the simulation in respect of private income levels could thus be improved if they incorporated intra-factor income changes utilising asset and asset-holdings of income unit types.

Despite these explainable caveats to the results, however, perusal of Table A2.5, suggests that the simulation works remarkably well, particularly at the disposable income level, given that it involves effectively a 5-year 'forecast'.

Government Redistribution. The most disturbing aspects as far as the validity of the simulation is concerned are the respective substantial overestimation and underestimation of the social security and taxation models compared to those revealed by the 1989-90 IDS. As far as social security is concerned, as for 1985-86, the simulation imputation calculates direct benefits at about 10 per cent more than that actually reported. That is explainable and at least consistent, particularly as the resultant $21.2b for all income units is closer to the $24.7b figure expended by the Department of Social Security from the Budget Papers (Commonwealth of Australia, Budget Paper No. 1, 1992-93, Table V: 3-286). This latter Budget figure could also include certain non-cash benefits and irregular payments. The simulation results over time maintain a **consistent** 80-85 per cent of those revealed in the Budget Paper.

However, the underestimate of the revenue yield from the income tax system for 1989-90 does represent a concern. The simulation result is some 14 per cent lower on average than the IDS imputation, although in 1985-86 it was only 2.3 per cent down. The majority of this difference occurred as a consequence of the latest revision to the IDS data by ABS. In the previous version, the survey result was only 5.5 per cent higher than the simulation result. In the absence of any detailed documentation of the ABS tax imputation model to account for the dramatic increase in tax liability of $4.2b (about $10 per week per income unit) or almost 10 per cent in the latest revision, it is difficult to account for the difference. However, most ($4.15b) occurs amongst non-self-employed units. Given the complications raised for modelling imputation of the tax system by the introduction of dividend imputation in 1987 (see Section 4 of text), this needs further examination.

The initial unit record tape of the results of the 1989-90 survey was released by ABS in December 1991. Following the detection of several inconsistencies and errors, two subsequent revised tapes were released. As still further errors were detected the ABS conducted a full 'audit' of the survey results, warning users to treat the released versions as preliminary estimates, and in particular expressing concern at the disposable income data. After an exhaustive process the 'final' version of the tape was released in March 1993 with an accompanying letter detailing the errors detected and the impact of the changes made. For this brave stance, the ABS deserves the highest accolades.

Most of the revisions in number were relatively minor and affected the private income levels of income units. However, as Table A2.6 documents, by far the most significant change was in respect of the estimated direct tax liabilities. For the non-self-employed population, which the microsimulation deals with, aggregate tax liabilities apparently increased $4160 million dollars or by almost 12 per cent. Whilst this was partly explainable by an increase in the estimated population of 1.3 per cent, as Table A2.6 shows, the average mean tax liability increased by 10.4 per cent or $554 annually per income unit from $5324 to $5878.

Table A2.6: Impact of ABS Revision of 1989-90 File

	Final Version	Previous Version	Difference	Final/ Previous (%)
	(A) Non-Self-Employed Population			
Total($b)				
Private	169.6	166.8	+2.75	101.7
Gross	187.9	185.2	+2.78	101.5
Disposable	148.7	150.1	-1.38	99.1
Direct Benefits	18.3	18.3	+0.03	100.3
Direct Tax	39.3	35.1	+4.16	111.8
Population ('000)	6679.4	6595.6	+84.8	101.3
Mean ($)				
Private	25389	25299	+90	100.4
Gross	28136	28077	+59	100.2
Disposable	22258	22753	-495	97.8
Direct Benefits	2747	2778	-31	98.9
Direct Tax	5878	5324	+554	110.4
	(B) Total Population (Including Self-Employed)			
Total ($b)				
Private	208.0	205.7	+2.39	101.1
Gross	227.0	224.7	+2.34	101.0
Disposable	177.9	179.7	-1.86	99.0
Direct Benefits	19.1	19.0	+0.05	100.3
Direct Tax	49.2	45.0	+4.20	109.3
Population ('000)	7672.7	7612.8	+59.9	100.8
Mean ($)				
Private	27104	26981	+123	100.5
Gross	29591	29478	+113	100.4
Disposable	23184	23580	-396	98.3
Direct Benefits	2487	2497	-10	99.6
Direct Tax	6407	5898	+509	108.6

As a consequence, the estimated aggregate tax liability of the microsimulation fell from 93.4 per cent of the original survey result to 83.5 per cent. To date, the ABS has not documented the reasons for this dramatic change. The original simulation estimate was within the bounds of acceptability particularly when it is considered that the private income simulation estimate was 94.1 per cent of the revealed survey result.

Conversely, though, the ABS revision has resulted in the mean level disposable income of the simulation being very close to the survey result.

The other point to note from Table A2.6 is the relative magnitude of the revisions as detailed by the final column. These are in fact greater than the apparent discrepancy of the simulation from the survey result for most income concepts (see Table A2.1). It is unlikely that either the 1981-82 or 1985-86 unit record tapes have been subject to the same thorough revision as the ABS undertook for the 1989-90 tape. Hence, the revealed discrepancies are within the range of survey data revision, adding to the verisimilitude of the simulation results.

National Accounts and Taxation Statistics

Aside from the income surveys the other two primary reference sources for aggregate income, by source and taxation are the National Accounts and Taxation Statistics. The advantage of both is that they are provided annually rather than every four years as is the case for the IDS. However, both suffer from limitations which hinder direct comparability and necessitate certain adjustments.

The National Accounts, published by the ABS (Cat. No. 5204.0), provide details of income received for the household sector. Such income also includes a number of imputed elements such as owner-occupied dwelling rent, the imputed interest on life insurance and superannuation, as well as grants to non-profit organisations, third party insurance transfers, worker's compensation claims paid and employers' contribution to superannuation which are not incorporated in the survey definitions of income, which conceptually relates to regular cash payments. Moreover, the personal benefit payments in the National Accounts also include health benefit payments in addition to regular social security payments. It is therefore necessary for comparability to adjust the National Accounts Household Income statement to a comparable cash basis. This is done by excluding all personal benefit payments and all imputed items as well as non-regular items listed above. The comparative basis of the data presented in Table A2.7 is thus a taxable cash basis (excluding social security). In all cases, the latest data revision available has been utilised.

The *Taxation Statistics,* published annually by the Commissioner of Taxation, records details from tax returns lodged each financial year including details by type of income. However, much of the data is only provided for those taxpayers who have taxable income. With minimum threshold levels applying, this can exclude a large number of non-paying individuals, who receive income but not sufficient for the total to be taxable. This problem is mitigated to some extent by subsidiary tables which provide certain details relating to these of non-taxable individuals. Similarly, there are a number of individuals who either evade tax by not disclosing income or enter into arrangements to avoid tax by minimising their apparent taxable income. Conversely, the practice of the IDS of using taxation data to verify survey data (where possible) should ensure greater contiguity between that revealed from the surveys and the simulation and that revealed by the Taxation Statistics than that

Table A2.7: Aggregate Income by Source, National Accounts and Taxation Statistics: 1980-81 to 1990-91

National Accounts (Taxable Cash Basis)[a]

	Wages	Div.	Int.	Rent.	Unincorp Ent. Farm	Unincorp Ent. N-F	Unincorp Ent. Total	Other transfers from o'seas	Total
1980-81	69511	1015	5869	659	2810	9253	12063	709	89826
1981-82	80387	1045	8369	679	2384	9305	11689	798	102967
1982-83	88666	1035	10253	755	393	8659	9052	920	110681
1983-84	93590	1140	11032	978	3048	10479	13527	1320	121587
1984-85	102909	1235	12109	1099	2594	1101	13695	1418	132465
1985-86	113095	1450	16082	1098	1310	12531	13841	1820	147386
1986-87	123342	1614	18254	1177	1596	12976	14572	2231	161190
1987-88	136027	1870	18471	1493	3310	14276	17586	2726	178173
1988-89	153017	2458	22878	1342	4615	17166	21781	3313	204789
1989-90	170502	2698	27352	1190	3808	17517	21325	3410	226477
1990-91	177818	2233	23010	1670	986	17415	18401	3606	226738

Note: a) Excludes personal benefit payments and imputed items.

Taxation Statistics (Declared Taxable and Non-Taxable)

	Wages	Div.	Int.	Rent.	Unincorp Ent. Primary	Unincorp Ent. Other	Unincorp Ent. Total	Other Residual	Total
1980-81	67265	384	2823	264	1861	7415	9276	423e	80435
1981-82	78620	511	3755	246	1463	7920	9383	442e	92957
1982-83	86868	603	4432	293	253	8219	8472	687e	101355
1983-84	92305	624	4729	357	1271	9557	10828	559e	109402
1984-85	101834	709	5290	375	818	10420	11238	518e	119964
1985-86	113800	864	6819	328	668	12605	13273	490e	135574
1986-87	123262	925	8300	370e	1509	14103	15612	789e	149258
1987-88	141077	1474	8016	465	2755	16281	19036	2603e	172671
1988-89	156879	3216	8696	50	3185	19520	22705	5027e	196573
1989-90	170394	1979	11984	-131	2865	19267	22132	1754e	208112
1990-91	176219e	2064	10732	-201	894e	18117e	19011e	1800e	209625

revealed by the National Accounts for which revisions are constantly made, and, it is understood from private conversation with ABS officials, adjustment for understatement of self-employed income is also made.

The most directly comparable tax data is presented in Table A2.7 for each income source and relates to net income (prior to deductions) excluding pensions and benefits for both taxable and non-taxable individuals. It should be noted that certain estimates have been made for conceptual consistency of the data and these are indicated with the suffix 'e'.

Comparison of the Taxation and National Accounts data by income source in Table A2.7 gives some indication of the possible sources of evasion and avoidance. As may be expected, given the PAYE system, the data for wages is highly comparable. On the other hand, income in the form of dividend, interest and rent revealed in the tax data is significantly less than that revealed in the National Accounts.

The relative picture as regards farm income is confused because of averaging arrangements but surprisingly the declared income of non-primary unincorporated enterprises (including partnerships) in the tax data exceeds that in the National Accounts, suggesting that perhaps the National Account estimates need some revision or adjustment in this regard.

Comparing these results with those revealed by the simulation, Table A2.8 details the relationship in respect firstly of private income (excluding all pensions and benefits) for the total population and secondly with the exclusion of unincorporated enterprises and the non-self-employed population.

It becomes apparent that the simulated total private income retain a high degree of **consistency** with both the income revealed by the National Accounts and the Taxation Statistics. For the total population, the simulation produces comparative results which approximate 90 per cent of the National Accounts estimates and are even closer to the Taxation Statistics estimates. When all self-employed income units are excluded from the population, the simulation comparability drops to approximately 80 per cent of adjusted National Accounts and 85-90 per cent of Taxation Statistics. The reason for this drop is that in eliminating all self-employed income units from the simulation, we also exclude any non-self-employed income they may also be receiving from the total. On the other hand, both the National Accounts and Taxation Statistics estimates only exclude the income from unincorporated enterprises and retain income received from other sources.

The key point is that the simulation results and the aggregate comparisons are consistent over the period. However, it would appear that a 'hiccup' occurs in 1983-84 such that the simulation produces higher than expected total private income. In addition, whilst in general the consistency is maintained, it is apparent that the ratio to both the comparable National Accounts and Tax Statistics data declines in the last three years of the period. This suggests the need for further investigation into the cause to ascertain if it is linked to a particular form of income which the simulation is not picking up as well over time.

As far as the Tax Statistics are concerned, the result is linked to the treatment by the Taxation Commissioner in including dividend imputation credits as part of taxable income (for the purposes of determining the Medicare levy plus total tax liability) before deducting them again to determine actual tax payable (see discussion later in this Appendix). Such a treatment also explains in large part the apparently large residual other in the lower segment of Table A2.7 from 1987-88 onwards.

Table A2.8: Comparison of Simulation with National Accounts and Taxation Statistics, Private Income: 1981-82 to 1989-90

Year	National Accounts	Tax Statistics	Simulation	National Accounts	Simulation Relative (%) to Tax Statistics
Total Private Income ($m)					
1981-82	102967	92957	96534	93.8	103.8
1982-83	110681	101355	100246	90.6	98.9
1983-84	121587	109402	114721	94.4	104.9
1984-85	132465	119964	120850	91.2	100.7
1985-86	147386	135574	134064	91.0	98.9
1986-87	161190	149258	145518	90.3	97.5
1987-88	178173	172671	162050	91.0	93.9
1988-89	204789	196573	184045	89.9	93.6
1989-90	226477	208112	200472	88.5	96.3
Private Income (Excluding Unincorporated Enterprises)					
1981-82	91278	83574	76232	83.5	91.2
1982-83	101629	92883	82833	81.5	89.2
1983-84	108060	98574	90673	83.9	92.0
1984-85	118770	108726	96278	81.1	88.6
1985-86	133545	122301	108511	81.3	88.7
1986-87	146618	133646	117662	80.3	88.0
1987-88	160587	153635	128878	80.3	83.9
1988-89	183008	173868	144324	78.9	83.0
1989-90	205152	185980	159330	77.7	85.7

If we turn to the results after consideration of the social security benefit transfers and the imposition of tax, that is, total disposable income, as detailed comparatively in Table A2.9 we can see that this decline in the last three years appears to substantially disappear. In Table A2.9 we present total income after tax for both taxable and non-taxable individuals from the Taxation Statistics as well as two series from the National Accounts. The first of these is the familiar Household Disposable Income concept (and includes the various imputed and excluded items mentioned above) and the second is the Household Disposable Income adjusted as above to a cash basis (but including all personal benefits received). Both include unincorporated enterprises and are compared to the simulation results for the entire population (including self-employed income units).

The simulation results for total disposable income in aggregate show clear correspondence and consistency with the two National Account data sets. With slightly more variability, and considering that most government benefit recipients are excluded from the Taxation Statistics, the consistency between the simulation and those recorded in taxable incomes is also reasonably close. It must be

Table A2.9: Comparison of Simulation with National Accounts and Taxation Statistics, Disposable Income ($m): 1981-82 to 1989-90

Year	National Accounts (A)	National Accounts (B)	After-tax Taxation Statistics	Simulation	Simulation Relative % to NA[a]	NA[b]	Tax Stats.
1981-82	104170	94487	73208	83812	80.5	88.7	114.5
1982-83	114812	103282	80433	89909	78.3	87.1	111.8
1983-84	129015	115126	85182	10894	78.2	87.6	118.5
1984-85	140159	123729	92509	107053	76.4	86.5	115.7
1985-86	155392	136921	103360	117027	75.3	85.5	113.2
1986-87	168468	147293	112578	126666	75.2	86.0	112.5
1987-88	186011	163272	131861	144726	77.8	88.6	109.8
1988-89	210493	185787	149582	163987	77.9	88.3	109.6
1989-90	233927	208049	160433	180344	77.1	86.7	112.4

Note: (a) Refers to Household Disposable Income
(b) Refers to Household Disposable Income adjusted on a cash basis.

acknowledged, though, that in looking at taxation as a variable on its own, the simulation records the aggregate tax paid as a consistently declining ratio to that recorded in both the National Accounts and the Taxation Statistics. Whilst there are many feasible explanations for this, notably the income level attached to newly-forming households, the particular income levels where participation rates are changing, the changing nature of the labour market vis-à-vis full-time and part-time work and the income levels particularly affected, changes the ownership of income-producing assets, as well as demographic changes, it would be less than honest not to suggest that this warrants further detailed research. As it stands, the trend decline in simulated aggregate private income relative to the National Account and Taxation Statistics acts to counter the complementary trend decline in simulated total tax paid, such that the final disposable income total is a consistent and holding set of relativities. The two are, by definition, directly related. Improving the simulation of private income along the lines indicated earlier may well resolve the apparent discrepancy.

An examination of both Tables A2.8 and A2.9 reveals the close correlation between the simulation results of private income (Table B.8), total taxable income from the Taxation Statistics and the National Account data for cash adjusted household disposable income (including all personal benefits received (Table A2.9), as detailed in Table A2.10.

Whilst the National Account figures, in this case, are conceptually different from the other data (referring to disposable after-tax income), what is striking is the close consistency of the magnitude of the three estimates in each year.

Table A2.10: Comparison of Simulation with National Accounts, Private Income, Taxable Income and Household Disposable Income ($b): 1981-82 to 1989-90

Year	National Accounts (1)	Taxable Income (2)	Simulation (Private Income) (3)	Simulation ÷ National Accounts (4) (%)	Taxable Income ÷ National Accounts (5) (%)
1981-82	94.5	93.0	96.5	102.1	98.4
1982-83	103.3	101.4	100.3	97.1	98.2
1983-84	115.1	109.4	114.7	99.7	95.0
1984-85	123.7	120.0	120.9	97.7	97.0
1985-86	136.9	135.6	134.1	98.0	99.1
1986-87	147.3	149.3	145.5	98.8	101.4
1988-89	185.8	196.6	184.1	99.1	105.8
1989-90	208.0	208.1	200.5	96.4	100.0

Note: National Accounts - Refers to Household Disposable Income (including all personal benefits) adjusted on a cash basis.

Source: ABS National Accounts.
Taxation Statistics.

If one examines the relationship between the simulation and the National Accounts (column 4), this contiguity is remarkable. With the exception of the extreme years of the simulation 'forecast' (1981-82 and 1989-90), the simulation is very close (within 0.2-2.9 per cent) of the National Accounts estimate of household disposable income (cash-adjusted). Conceptually they are not the same thing: the simulation being **before** tax and social security and the National Accounts being **after** tax and personal benefits. However, the close relationship for each year and the **consistency** of that adds credence to the annual simulation results (between survey dates).

The trend relationship between taxable income from the Taxation Statistics and the National Accounts disposable income data provides evidence of declining levels of tax evasion. In 1983-84, **declared** taxable income was only 95 per cent of National Account disposable income, by 1988-89 it had risen to 105.8 per cent, although this later result may reflect the Tax Commissioner's treatment of dividend imputation credits as taxable income. However, the simulation is based upon the 1985-86 Income Survey and inherent levels of under-reporting (akin to evasion) at that time. This is particularly so in view of the use made of taxation records to verify responses in the survey. Hence, to the extent that levels of evasion were higher in earlier years of the decade and lower in later years, and were reflected in survey responses, then an estimate based on 1985-86 evasion (under-reporting) levels would overestimate pre-tax income in 1981-82 and under-estimate it in 1989-90. This accords with the results indicated in Table A2.1. Hence, the simulation could be improved relative to reported results if further work were undertaken to incorporate trends in likely evasion. One way to encompass this is to use a set of 'grossing-up' factors, based on

evasion (under-reporting) estimates by different sources of income. It is understood that the ABS uses such factors in respect of self-employed income in the National Accounts to account for underestimation.

To provide a basis for such a development, use could be made of the Household Expenditure Surveys to develop groupings of households by basic expenditure levels taking into account differences in size and composition and then relating these to revealed income by different sources, in the manner adopted by Pissarides and Weber (1989) for the UK.

- **Social Wage/Household Expenditure Survey**

As indicated in Appendix One, the social wage allocation in the simulation is essentially the allocation of an external expenditure from other ABS sources and the Budget Papers. However, whilst the allocation is based on total expenditure figures on health and school education they are specifically allocated to families on a derived exogenous per capita basis. That is, it is based on actual numbers of school-aged children each year. The simulation, through its demographic component, forecasts the number of children, and the income unit of each of these school-aged children receives the per capita allocation. Hence, it is possible for the total aggregate social wage allocation to differ from the original externally determined and sourced aggregate.

The extent to which such difference does occur largely reflects the simulation's capacity to demographically model the number of children, over time. In fact, in validating the aggregate allocation it is apparent from Table A2.11 which shows a consistent trend from under- to overestimate over time, that the simulation consistently overestimates the growth in the number of children.

The reason for this overestimation stems from the fact that the simulation is based on family size in 1985-86, but demographically the number of children per couple declined over the 1980s. Hence, the simulation forecasts less children based on 1985-86 family sizes in 1981-82 than in fact there were. Conversely, it overestimates the average number of children per family in 1989-90 (see Harding, 1993: 9).

Similarly a comparison of allocated to actual health expenditure (also shown in Table A2.11) shows a consistent underestimation. Despite the fact that total health expenditure is comprehensively allocated within each age category on a per capita basis (with an externally-determined population) such that the per capita allocation is constrained to the actual, it also remains a fact that the survey population (reflected in the simulation) is not the same as the total population. As pointed out earlier, the survey does not cover people living in institutions or non-private dwellings. Thus the total allocated amount (even of this comprehensive per capita allocation) does not equate to total actual expenditure on included health items. The consistent degree of underestimation in Table A2.11 therefore reflects the extent of expenditure on the excluded institutionalised population.

Table A2.11: Comparison of Simulation with Actual Social Wage (Education) Allocation, Total: 1981-82 to 1989-90

Year	Education Allocation/Survey %	Number of Children at School Simulation	Number of Children at School Survey	Health Allocation/Survey %
1981-82	96.21	2877568	2991026	93.99
1982-83	97.71	2936154	3005067	93.50
1983-84	98.30	2965352	3016542	93.30
1984-85	98.96	2980753	3011886	92.97
1985-86	99.31	2983258	3003779	92.48
1986-87	101.23	3040134	3003136	91.72
1987-88	103.29	3112591	3013606	91.91
1988-89	102.43	3100401	3026858	91.88
1989-90	104.21	3184431	3055894	91.56

Source: Survey derived from ABS, Cat. Nos. 4202.0; 4215.0; 4216.0; and 4221.0.

Despite these minor deficiencies in the demographic structure of the simulation, the resultant aggregates are validated by comparison with the results (adjusted for period differences) of the 1984 and 1988-89 HES 'Fiscal Incidence' studies (ABS, 1987 and 1992). Some caution, however, must be exercised because of the different methodological bases of the two studies, which as we have already noted produce different aggregate results for 1988-89.

Conclusion

In summary then, on a validation based on aggregate variables, the simulation holds up as relatively robust and consistent over time. The validation does, however, suggest that improvements in the private income module and the demographic module would further enhance the capacity of the microsimulation to replicate the 'actual' insofar as the periodic surveys reveal that.

The sole unexplainable point of concern relates to the difference between the direct taxation aggregate for the final revised tape for 1989-90 compared to the simulation estimate.

The essence of the simulation is not so much the aggregates as the revealed levels of inequality - that is the capacity of the model to replicate the distribution of each income concept and related social security and taxation. It is to these that we now turn.

A2.2 Distributional Outcomes

As indicated above, the essence of the microsimulation is to provide annual estimates of living standards by family type and consequent annual estimates of inequality by various income concepts: private (or market), gross (including direct government cash payments), disposable (after direct income tax) and final (including imputed allocation of social wage expenditure).

The critical assessment of its validity is, therefore, its capacity to replicate revealed distributional outcomes. In assessing this in this section, in colloquial terms, we put the microsimulation 'through the wringer', by testing it against a full range of distributional measures.

Summary Measures

As indicated in the text, in spite of its limitations, the most commonly utilised summary measure of inequality is the Gini coefficient. These limitations: that it tends to be relatively insensitive to change; that it is responsive more to changes in the middle of the distribution and less sensitive to changes at the top and bottom extremes of the distribution; and that it is not capable of being neatly decomposed into its component income type or recipient characteristic factors - hinder its applicability to analytical research. However, as a descriptive measure, it has an explainable graphical derivation and a logical base in that it is directly related to the mean average difference between every member of the population, and this conceptually does measure distributional difference. The fact that more of the population are in the middle as a consequence makes it middle-sensitive.

For reference purposes, Table A2.12 reproduces the simulation results obtained for the various income concepts examined (Table 6.1 in the main text).

In Table A2.13, comparisons are provided for the calculated Gini coefficient between the simulation results for the concepts of private, gross and disposable income and the actual results obtained from the Income Survey unit record tapes for 1981-82, 1985-86 and 1989-90, for annual income, for all income units excluding those self-employed (for reasons related to data quality outlined in the text). The results are provided both for the unadjusted distribution and the equivalent income distribution using the OECD equivalence scale.

It will be recalled that the disposable income estimate is the outcome of three imputations: a forward- and backward-dated private income estimate; the imputation of social security entitlements based on that private income estimate; and the imputation of income tax obligations based on the estimated gross income estimate and its component sources.

It should be noted that as far as disposable income is concerned, although questions in the surveys were asked about actual tax paid, with reference to tax return or

Table A2.12: Simulated Distribution of Income, Equivalent Income (Non-self-employed Population): 1981-82 to 1989-90

Year	Private	Gross	Disposable	Final (Budget)	Final (Public Sector)
1981-82	.487	.370	.316	.297	.272
1982-83	.505	.376	.323	.303	.279
1983-84	.509	.375	.319	.297	.274
1984-85	.509	.372	.315	.288	.266
1985-86	.504	.373	.314	.288	.265
1986-87	.509	.377	.316	.290	.267
1987-88	.508	.375	.328	.301	.278
1988-89	.502	.374	.331	.301	.282
1989-90	.501	.372	.324	.295	.276

Table A2.13: Comparison of Simulation with Surveys, Income Distributions, Gini Coefficients, Non-self-employed Income Units: Survey Years

	Survey	Simulation	Simulation/Survey (%)	Simulation Less Survey
Unadjusted (Non-Equivalent) Income				
1981-82				
Private	.495	.513	103.6	+.018
Gross	.392	.418	106.6	+.026
Disposable	.348	.368	105.8	+.020
1985-86				
Private	.524	.525	100.2	+.001
Gross	.416	.416	100.0	-
Disposable	.361	.360	99.7	-.001
1989-90				
Private	.529	.526	99.4	-.003
Gross	.429	.417	97.2	-.012
Disposable	.375	.376	100.3	+.001
Equivalent Income (OECD Scale)				
1981-82				
Private	.476	.487	102.3	+.011
Gross	.352	.370	104.1	+.018
Disposable	.304	.316	104.0	+.012
1985-86				
Private	.505	.504	99.8	-.001
Gross	.373	.373	100.0	-
Disposable	.315	.314	99.7	-.001
1989-90				
Private	.502	.501	99.8	-.001
Gross	.382	.372	97.4	-.010
Disposable	.324	.324	100.0	-

assessment records, the ABS did not release this data either in 1981-82 or 1989-90. This was presumably because of some doubts about the validity of the data obtained. As a result, imputed tax (which was then deducted from actual gross income to obtain unit record disposable income) was calculated in both years. In 1981-82, the source was the imputation outlined in Saunders and Hobbes (1988) and for 1989-90, the ABS itself provided the imputed tax variable. In consequence, when we refer to 'actual' survey data for 1981-82 and 1989-90, at the disposable income level this is in fact a misnomer with the comparison (at least, in part) being between one imputation and another. In respect of the 1981-82 imputations, the principal difference between the imputation utilised for this paper and the Saunders and Hobbes imputation lies in the latter's inclusion of the taxable component of lump sum superannuation payments which is excluded from this microsimulation.

Disposable, Gross and Private Income. As the principal aim of the simulation is a series outlining disposable equivalent income to which the social wage allocation is added, we concentrate on that result first (with the caveat mentioned in the previous paragraph). In that regard, the results outlined in Table A2.13 are encouraging. For both 1985-86 and 1989-90 the estimated Gini coefficient is only out by .001 for 1985-86 and is exact to the third decimal point for 1989-90.

For 1981-82, the disposable income estimate is an overestimate of .012 or 4 per cent, although this is largely due to the .013 or 2.3 per cent overestimate in the estimated Gini coefficient for the private (or market) income concept. As the previous section examining the validity of the aggregate values derived by the simulation indicated, this stems essentially from the inability (at present) of the microsimulation to adequately reflect intra-factor distributional changes, that is, changes within the wages sector (even though the methodology separates changes in the full- and part-time sub-markets) and within the capital income sector. Since the simulation is based on the distribution of the income from such capital and wages as revealed in the 1985-86 survey, then 'back-dating' the average income changes from that source would a priori lead to an overestimate of such income for those higher-income recipients in 1981-82 than the actual survey indicated, resulting in the observed overestimate of private income inequality. Similarly, examination of the full-time wage data from annual wages surveys by ABS (Catalogue No. 6310.0) suggests that in that period, even amongst full-time wage earners those on higher wages received substantially more than the mean average increase for all such wage recipients.

Consequently, this period when the simulation is based on the 1985-86 outcome would lead to an overestimate both of the incomes of high wage earners in 1981-82 and of the extent of private income inequality at that earlier time. With the introduction and operation of the Prices and Incomes Accord such rapid increases in intra-wage inequality were reduced, or alternatively increases to higher wage earners were received not in money wage form but through fringe benefits (see Raskall, forthcoming) which are not presently incorporated in the simulation or the survey, so that this technical limitation was not evidenced in the period from 1985-86 to 1989-90.

If the simulation methodology were improved by the more adequate incorporation of such intra-factor (or intra-income component) inequality then this apparent discrepancy may not arise. As it stands, the overestimated income of high income earners for 1981-82 is translated through both the social security and income tax imputations by underestimating the inequality reduction of social security (which it does by 5.6 per cent) and overestimating the inequality reduction of income tax (which it does by 12.5 per cent). The absolute impact of both on the Gini coefficient virtually cancel each other out to produce the observed result that the overestimate of disposable income inequality arises almost totally from the overestimate of private income inequality.

When we examine the unadjusted (non-equivalent) income distribution Gini coefficients in Table A2.13, the observations made above similarly hold. The simulation produces estimates for the disposable income concept that are within .001 (or 0.3 per cent) for both 1985-86 and 1989-90 but the overestimate of .020 (5.8 per cent) for 1981-82 is almost entirely accounted for by the apparent overestimate of .018 in the calculated Gini coefficient for private income.

The addition of all self-employed income units into the population so that all income units are included, as outlined in Table A2.14, confirms the robustness of the results, despite concerns we may have about the quality of the self-employed data between the surveys. Again, for the disposable income concept both the 1985-86 and 1989-90 estimated Gini coefficients for unadjusted (non-equivalent) income are within .001 (or less than half of one per cent) of the actual recorded in the surveys, but are overestimated for the earlier 1981-82 survey. Whilst the 1985-86 result is to be expected given the methodology, the latter result is gratifying as far as verisimilitude is concerned.

The extent of the accuracy of the simulation revealed by this comparison of alternative estimates of the calculated Gini coefficient can be placed in appropriate statistical context if we consider the standard error of the Gini.

Standard Error of Gini Coefficient. Since the estimates are based on data obtained from a sample, they are subject to sampling variability; that is, they may differ from the figures that would have been produced if all dwellings had been included in the survey. One measure of the accuracy associated with estimates from a sample is given by the standard error of an estimate. There are about two chances in three that a sample estimate will differ by less than one standard error from the figure that would have been obtained from a comparable complete enumeration, and about nineteen chances in twenty that the difference will be less than two standard errors.

Whilst ABS generally publishes tables of standard errors of population and non-population (for example, mean income) estimates, little has been documented on standard errors associated with the Gini coefficient, let alone differences between two values of the Gini. Table A2.15 is derived from ABS (1980, Cat. No. 4101.0: 191) which provided such a table.

Table A2.14: Comparison of Simulation with Surveys, Income Distributions, Gini Coefficients, All Income Units: Survey Years

	Survey	Simulation	Simulation/Survey (%)	Simulation Less Survey
1981-82				
Private	.486	.508	104.5	+.022
Gross	.399	.428	107.3	+.029
Disposable	.352	.379	107.7	+.027
1985-86				
Private	.513	.514	100.2	+.001
Gross	.421	.420	99.8	-.001
Disposable	.365	.364	99.7	-.001
1989-90				
Private	.518	.515	99.4	-.003
Gross	.433	.422	97.5	-.011
Disposable	.380	.381	100.3	+.001

Table A2.15: Standard Errors in Gini Coefficients

Population (on which Gini coefficient based)	Standard Error (Per cent of Gini coefficient)
4000	18.0
5000	16.0
10000	11.0
20000	7.9
50000	5.1
100000	3.6
200000	2.5
500000	1.6
1000000	1.1
2000000	0.8
5000000	0.5
10000000	0.4

Source: ABS, *Social Indicators No. 3*, 1980, Cat. No. 4101.0: 191 and author's own calculations.

Technically, the Gini coefficient's standard error is:

$$G \sqrt{(c^2 + 1/2)/n}$$

where c is the coefficient of variation and n is the sample size (Cowell, 1977: 131).

These figures will not give a precise measure of standard error of a particular Gini coefficient but will provide an indication of the magnitude of the standard error. Thus, for the population of non-self-employed income units in 1989-90 (6,679,400) the disposable income Gini was 0.324. Then the standard error on the estimated Gini coefficient would be 0.5 per cent of the coefficient. Therefore, there would be about two chances in three that the true figure lay within the range (0.324 - (0.005 x 0.324)) to (0.324 + (0.005 x 0.324)) or 0.322 to 0.326, and about nineteen chances in twenty that the coefficient lay between 0.321 and 0.327.

For some of the specific income unit types, with much smaller populations (e.g. sole parents) these standard errors are much greater. The approximate standard error for the Gini for each income unit type for equivalent disposable and private income over the 1980s is shown in Table A2.16.

Moreover, the difference between survey estimates is also an estimate and is therefore subject to sampling variability. The standard error of the difference between two survey estimates (e.g. the difference between the Gini estimate for gross and disposable) depends on the standard errors of the original estimates and on the relationship (correlation) between the two estimates. However, an approximate standard error of the difference between two estimates (x-y) may be calculated by the formula:

$$\text{Standard error (x-y)} = \sqrt{[\text{Standard error (x)}]^2 + [\text{Standard error (y)}]^2}$$

Thus, whilst this formula is only exact for uncorrelated (unrelated) characteristics, for the purposes here it provides a good approximation as outlined in Table A2.17.

Specific Income Unit Types. The microsimulation, and subsequent analysis, separates income units into seven specific types, based on marital status, age of head, and presence of children. This is important not merely for the allocation of social wage expenditure and social security imputations but also to examine the nature of living standard changes and to provide the basis for further analysis of, for example, those under some pre-determined poverty line in any particular year.

In Table A2.18, the Gini coefficients calculated from the simulation and from the survey results for each survey year for both the private and disposable income concepts are summarised. Leaving aside the results for 1985-86 for which, because of the methodology used the potential for error is much reduced (although the outcome at a disposable income level of the social security and taxation imputations are gratifying), the results for 1981-82 and 1989-90 again add encouragement to the validity of the simulation.

Table A2.16: Standard Errors for Specific Income Units

Income Unit Type	Standard Error (% of Gini)	Approximate Absolute Value P[a]	Approximate Absolute Value D[b]
Single			
<25	1.1	0.004	0.003
25-64	1.0	0.004	0.003
65+	1.6	0.013	0.003
Couples without children			
<65	1.1	0.004	0.003
65+	1.8	0.014	0.004
Couples with children	0.0	0.003	0.002
Sole Parents	2.5	0.017	0.007
All	0.5	0.003	0.002

Note: a) P = Private or Market;
b) D = Disposable.

Table A2.17: Standard Errors in Differences in Gini Coefficients

Income Unit Type	SS[a] (P-G)	T[b] (G-D)	G[c] (P-D)
Single			
<25	.005	.005	.005
25-64	.006	.005	.006
65+	.014	.006	.013
Couples without children			
<65	.005	.005	.005
65+	.015	.008	.014
Couples with children	.004	.004	.004
Sole Parent	.019	.012	.019
All	.003	.002	.003

Notes: a) SS - Social Security = Difference between private and gross Gini.
b) T - Income Tax = Difference between gross and disposable Gini.
c) Government Redistribution = Difference between private and disposable Gini coefficient (equals sum of SS and T).

Table A2.18: Comparison of Simulation with Surveys, Income Distributions by Income Unit Type (Non-self-employed), Gini Coefficients: Survey Years

	1981-82			1985-86			1989-90		
	S_1[a]	S_2[b]	S_1/S_2[c]	S_1[a]	S_2[b]	S_1/S_2[c]	S_1[a]	S_2[b]	S_1/S_2[c]
Single <25									
P[d]	.371	.348	107	.387	.384	101	.374	.366	102
D[e]	.282	.269	105	.288	.290	99	.289	.284	102
Single 25-64									
P[d]	.451	.446	101	.460	.458	100	.460	.474	97
D[e]	.315	.312	101	.307	.306	100	.324	.325	100
Single 65+									
P[d]	.822	.818	101	.814	.813	100	.813	.798	102
D[e]	.217	.214	101	.216	.216	100	.232	.247	94
Couples without children, <65									
P[d]	.379	.344	110	.390	.389	100	.384	.366	105
D[e]	.277	.254	109	.275	.276	100	.286	.277	103
Couples without children, 65+									
P[d]	.754	.759	99	.745	.746	101	.743	.734	101
D[e]	.245	.238	103	.244	.245	100	.264	.283	93
Couples with children									
P[d]	.294	.280	105	.308	.307	100	.310	.320	97
D[e]	.219	.211	104	.218	.219	100	.236	.237	100
Sole Parent									
P[d]	.693	.677	102	.705	.690	102	.667	.667	100
D[e]	.313	.285	110	.294	.290	101	.289	.305	95
All									
P[d]	.513	.495	104	.525	.524	100	.526	.528	100
D[e]	.368	.348	106	.360	.361	100	.376	.375	100

Notes:
a) S_1 - Gini coefficient from simulation
b) S_2 - Gini coefficient from survey
c) S_1/S_2 - Simulation divided by survey (%)
d) P - Private (market) income
e) D - Disposable income

Taking the results for each income unit type for 1981-82, the simulation works (at least as far as comparison with the actual 1981-82 survey is concerned) particularly well for single people aged over 25 at both a private and disposable income level. In general, where the simulation overestimates the disposable income Gini it is a consequence of an overestimate of private income inequality. The concentration of this in working aged couples and young single-person income units adds validity to the hypothesis suggested above about the possibility of improvement in the intra-

factor income inequality 'back-dating' in respect of income from capital for couples and income from wages for young singles. The fact that the simulation works better for singles rather than couples reflects the difficulties of incorporating individually-based imputations to socially-based families despite separating the labour force experience of married females and males. For instance, the apparent 'premium' to married men revealed in wages surveys (and applied in the simulation) may not exist at the higher income levels to the degree it does at lower wages. All of this suggest opportunities for 'fine-tuning' whilst confirming the overall robustness of the model.

If we look across Table A2.18 to the results for 1989-90, again the simulation produces overall distribution outcomes close to those revealed by the actual survey. At the disposable income level, the 'worst' results, where there is a 5-6 per cent discrepancy in the Ginis, occur in respect to aged income units and sole parents. Given that this discrepancy appears to arise in the tax-social security transfer imputations, possibly more attention could be directed towards improving those. For those with a more direct involvement in the labour market, the simulation tends to produce satisfactory correspondence.

In fact, if the comparison is extended to all income units, including self-employed, as in Table A2.19, the comparative results for 1989-90 in particular are even closer. From Table A2.19, for 1989-90, the 'worst' result, a five per cent discrepancy between the estimated and survey Gini for couples with no children where the head is aged under 65 is explainable by the five per cent discrepancy at the private income level. For all other income unit types the discrepancy is within three per cent. In particular, the discrepancy noted above for those income units defined as non-self-employed amongst those income units where the head is aged over 65 is totally eliminated. This suggests the possibility that the earlier discrepancy arises by virtue of the specific operational definition required to identify the 'self-employed' aged, rather than the previously indicated tax-social security transfer imputations. The definition utilised may apply for working-aged families but not be as applicable for those families who are beyond the retirement age, where income from capital becomes a more significant element. That is, so-called self-employment income for these people may in fact be more in the form of dividend income from their own business rather than payment for labour.

In summary, then, an examination of the comparability of the Gini coefficients, particularly at the disposable income level, between the simulation and the results obtained from the three Income Distribution Surveys in the period, indicates that the simulation provides an acceptably accurate correspondence. This suggests that the other simulated results obtained for the other years may be taken as an accurate reflection of the levels of inequality in disposable income applying in those years. This applies to the total population of income units as well as to each income unit type. However, the comparison also highlighted areas in which the simulation could be fine-tuned, particularly in respect of base private income inequality in earlier years, by incorporating improved intra-factor income component distributional changes.

Table A2.19: Comparison of Simulation with Surveys, Income Distributions, by Income Unit Type (All Income Units), Gini Coefficients: Survey Years

	1981-82			1985-86			1989-90		
	S_1[a]	S_2[b]	S_1/S_2[c]	S_1[a]	S_2[b]	S_1/S_2[c]	S_1[a]	S_2[b]	S_1/S_2[c]
Single <25									
P[d]	.380	.349	109	.386	.383	101	.378	.369	102
D[e]	.380	.270	109	.290	.291	100	.288	.288	100
'Single 25-64									
P[d]	.462	.477	103	.467	.465	100	.467	.475	98
D[e]	.331	.317	104	.319	.319	100	.337	.334	101
Single 65+									
P[d]	.828	.814	102	.810	.809	100	.812	.797	102
D[e]	.249	.227	110	.234	.224	104	.258	.258	100
Couples without children, <65									
P[d]	.394	.353	112	.397	.396	100	.393	.375	105
D[e]	.302	.265	114	.292	.293	100	.308	.292	105
Couples without children, 65+									
P[d]	.758	.744	102	.739	.740	100	.740	.727	102
D[e]	.294	.267	110	.268	.253	106	.298	.299	100
Couples with children									
P[d]	.323	.308	105	.332	.331	100	.335	.341	98
D[e]	.250	.235	106	.242	.244	99	.265	.261	102
Sole Parents									
P[d]	.687	.663	104	.698	.683	102	.659	.665	99
D[e]	.328	.292	112	.307	.303	101	.301	.312	97
All									
P[d]	.508	.486	105	.514	.513	100	.515	.518	99
D[e]	.379	.352	108	.364	.365	100	.381	.380	100

Notes:
a) S_1 - Gini coefficient from simulation
b) S_2 - Gini coefficient from survey
c) S_1/S_2 - Simulation divided by survey (%)
d) P - Private (market) income
e) D - Disposable income

Other Evidence. Over the period of analysis, the simulation results, as measured by the Gini, tended to show a movement in inequality in a wave-like fashion for both income units and households (see Figures 3.1 and 3.2 in the text).

In addition to the provision of data on a consistent annual period basis, the Income Surveys also collected data on 'current' income as at the time of the survey. The surveys were undertaken in a three month period from September to December in the financial year after the annual data (which we have used to date) is provided. Thus,

the 1985-86 Income Survey was in fact undertaken between September and December 1986. Similarly, the 1989-90 survey interview occurred within the period of September to December 1990. This 'current' income concept, is in fact, a hybrid involving current (that is, the most recent period's e.g. a fortnight, receipt of) wages and social security pensions and benefits although it still retains and incorporates the weekly equivalent of the last available financial year's income from capital and self-employed business. To the extent that wages and social security payments make up a large proportion of total income (about 75 per cent), then the resultant 'current' income estimate provides an approximate estimate of income distribution in the early part of the next financial year - that is, in early 1982-83, 1986-87 and 1990-91, subject to unreported changes that may have occurred in the distribution of income from capital and self-employment business. Thus, a comparison of the current to the annual results can provide at least a partial indication of the short-term trend in inequality.

Table A2.20 provides these estimates of current and annual gross income inequality (Gini measure) for each of the surveys undertaken, for both all income units and all households. The change indicated by the difference can then be examined against the direction of the change indicated by the simulation.

The simulation indicated that compared to 1981-82, gross income inequality rose dramatically in 1982-83; and in 1986-87, compared to 1985-86, it also rose. Since 1989-90 represented the final year of analysis no data is available for 1990-91, although both wage survey data and taxation data (see Raskall, 1993) suggest reduced inequality in that year before the unemployment attendant on the recession 'bit'.

Table A2.20 indicates that gross income inequality rose dramatically in early 1982-83, reflecting the recession then, which would add confirmation to the microsimulation result. For early 1986-87 the picture is more ambiguous. From the income surveys inequality would appear to have marginally fallen, although using the coefficient of variation measure (more sensitive to the upper-middle segment of the distribution) inequality rose. Conversely, at a household level, from the survey, inequality for gross income rose by both the Gini and coefficient of variation in early 1986-87.

Again, given the significance of wages (about 65 per cent of all income) it is notable that the Gini coefficient for the distribution of wage income of full-time and all employees (ABS, Cat. No. 6310.0) shows a similar cyclical movement over the 1981-89 period (see Raskall, 1993, Figure 1). Indeed, the graphical pattern of movement of the Gini for all employees over the 1980s virtually replicates the quasi-simulation results presented in Figure 4.1 of the main text which graft the social security and taxation imputations to the actual private income inequality trends revealed in the surveys (to account for intra-factor income inequality change).

Partial though this evidence may well be it complements rather than contradicts the annual pattern revealed by the simulation. To that extent, it could be argued that it provides additional support to the results obtained.

Table A2.20: Observed Current and Annual Inequality by Income Units and Households, Income Surveys: Survey Years

	Income Units			Households		
	Annual	Current	Difference (C-A)	Annual	Current	Difference (C-A)
1981-82	.399	.416	+.017	.374	.393	+.019
1985-86	.418	.414	-.004	.393	.397	+.004
1989-90	.430	.421	-.009	.402	.397	-.005

Specific Imputations

Whilst the disposable income concept is the most relevant for the purposes of the cash-income exercise undertaken in this paper it must be recalled that, aside from the demographic shifts encapsulated in the weightings program, the disposable income estimate in the microsimulation is the outcome of three separate simulations or imputations: the income component shifts over the period to determine private income inequality; the imputation each year of the social security system; and the imputation each year of the income tax system. Beyond this resultant disposable income estimate, a fourth imputation in allocating the designated social security expenditure is undertaken in arriving at the final estimate.

Just as the verisimilitude of the overall outcome can be assessed by comparison with the observed result obtained from the surveys so each of these simulation/imputations can be compared to the implicit component outcomes revealed in the surveys.

Private Income Imputation. In our discussion of disposable income outcomes above we examined the overall and income unit type specific private inequality estimates. In this section we particularly examine each of the other imputations. Prior to doing so, however, it needs to be made clear that they are not totally independent and are in fact related. Thus, if the private income inequality is overestimated such that too much income is assigned to certain income units then the social security entitlements and income tax obligations may be in consequence underestimated and overestimated respectively. Nevertheless we would expect a reasonably close correspondence between the impact on inequality reduction (as measured by the before and after change in the Gini coefficient) of the social security and taxation systems in each corresponding year. Similarly, the impact of the social wage imputation can be compared with the results of the ABS fiscal incidence studies (ABS, 1987 and 1992; White and Posselt, 1992) for the relevant expenditure inclusions.

Overall Direct Transfer System (Social Security and Taxation). In Table A2.21 the reduction in inequality in the Gini coefficient that could be interpreted as being

Table A2.21: Comparison of Simulation with Surveys, Income Distributions, Impact of Direct Cash Transfer (Social Security and Taxation), Gini Coefficients: Survey Years

	Survey	Simulation	Simulation/Survey (%)	Simulation Less Survey
		Equivalent (OECD scale) Income		
1981-82				
SS[a]	.124	.117	94	-.007
T[b]	.048	.054	113	+.006
G[c]	.172	.171	99	-.001
1985-86				
SS[a]	.132	.131	99	-.001
T[b]	.058	.059	102	+.001
G[c]	.190	.190	100	-
1989-90				
SS[a]	.120	.129	108	+.009
T[b]	.058	.048	83	-.010
G[c]	.178	.177	99	-.001
		Unadjusted (Non-Equivalent) Income		
1981-82				
SS[a]	.103	.095	92	-.008
T[b]	.044	.050	114	+.006
G[c]	.147	.145	99	-.002
1985-86				
SS[a]	.108	.109	101	+.001
T[b]	.055	.056	102	+.001
G[c]	.163	.165	101	+.002
1989-90				
SS[a]	.099	.109	110	+.010
T[b]	.054	.041	76	-.013
G[c]	.153	.150	98	-.003

Notes:
a) SS = Social Security = Gini (Private) - Gini (Gross)
b) T = Income Tax = Gini (Gross) - Gini (Disposable)
c) G = Combined Tax-Social Security = Gini (Private) - Gini (Disposable)

due to the social security system (the Gini coefficient for Private less that for Gross), the taxation system (the difference between the Gini coefficient for Gross and Disposable) and the combined cash transfer system (the difference between the Private and the Disposable) that arises out of the simulation and the comparable survey are outlined. Both results exclude self-employed income units. The data are derived from Table A2.14.

Again, it should be recalled that, in fact, the so-called actual survey estimates for the impact of the taxation system are not from data collected in the survey but from other imputations themselves. For 1981-82 this is the imputation (held at the SPRC) by Hobbes and utilised (and described) in Saunders and Hobbes (1988). For 1989-90, the imputation was that provided on the unit record tape by ABS.

As for the outcome with respect of disposable income, the outcome for the combined government cash tax and social security system is impressive. On an equivalent income basis the operation of the simulation for combined tax and social security reduces the private income concept Gini coefficient by .171 in 1981-82, whereas the observed reduction from the survey is .172, a difference of a mere .001 (or less than 1 per cent). For 1985-86, the simulation reduction exactly matches that of the actual survey and for 1989-90, the difference is again a mere .001 (or less than 1 per cent). It would be tempting to stop here and bask in that result.

However, below this combined surface we note from Table A.21 that for 1981-82 and 1989-90 the aggregate outcome arises from an overestimated impact of either tax or social security negating an equal underestimate of the other. In the case of 1981-82, as we noted previously, the overestimate of private income inequality for the reasons already discussed may be likely to produce an underestimate of the impact of social security and an overestimate of the impact of tax. No such ready explanation is available for 1989-90, however. There, reference back to Table A2.14 indicates a close parity between the simulation estimate of private income inequality and the survey result for that year. Yet from Table A2.21, the simulation estimate of the impact of social security overstates the recorded impact by 8 per cent or .009. Conversely, and more disturbingly, the apparent impact of the tax system in the simulation is to reduce the primary Gini by .048 whereas the apparent impact from the actual survey data tape (ABS imputation) is a reduction of .058 (a rate on a par with the 1985-86 survey result).

Reference to the unadjusted (non-equivalent) income results in the lower half of Table A2.21 does little to resolve this discrepancy. Again the 1981-82 and 1985-86 discrepancies are either acceptable or explainable. However, if anything, the 1989-90 result is even worse in that the difference in impact of the tax system becomes .013 or 24 per cent, sufficient to reduce the verisimilitude of the combined social security - tax impact.

The inadequacy of the apparent redistributive impact of the tax system in the simulation for 1989-90 is not resolved if self-employed income units are added to the population so that all income units are incorporated as in Table A2.22. Most of the other results are generally acceptable.

Specific Income Units. Bearing in mind the standard of Gini coefficient errors disucssed above, in Table A2.23 we compare the cash transfer simulation results to the actual survey outcomes for each of the seven designated income unit types. As in Table A2.18, unadjusted income is used and the population limited to non-self-employed income units.

Table A2.22: Comparison of Simulation with Surveys, Income Distributions, Impact of Direct Cash Transfers, All Income Units (Unadjusted Income), Gini Coefficients: Survey Years

	Survey	Simulation	Simulation/Survey (%)	Simulation Less Survey
1981-82				
SS[a]	.087	.080	92	-.007
T[b]	.047	.049	104	+.002
G[c]	.134	.129	96	-.005
1985-86				
SS[a]	.092	.094	102	+.002
T[b]	.056	.056	100	-
G[c]	.148	.150	101	+.002
1989-90				
SS[a]	.085	.094	110	+.009
T[b]	.053	.042	79	-.011
G[c]	.138	.134	97	-.004

Notes:
a) SS = Social Security = Gini (Private) - Gini (Gross)
b) T = Income Tax = Gini (Gross) - Gini (Disposable)
c) G = Combined Tax-Social Security = Gini (Private) - Gini (Disposable)

In respect of the combined effect of both forms of government redistribution, for almost two-thirds of the 21 sets of results the simulation produces estimates that are within 5 per cent of the actual survey estimates, with only 2 'out' by more than 10 per cent (singles 25-64 in 1989-90 and childless couples in 1981-82). In terms of the applicable standard errors, it is only for couples without children in 1981-82 that the bounds of estimates for one standard error of the simulation and the actual do not intersect at some point.

For the specific estimated social security impact (as measured by the absolute difference of the Gini coefficient for private and gross income), the extension of the estimates to the ranges bounded by one standard error results in an intersection of the 'actual' and simulated in all of the 1981-82 and 1985-86 cases and all bar the elderly singles, elderly couples and childless couples in 1989-90. That is, in 18 of the 21 comparative data sets, the application of the one standard error 'rule' would see the range of estimated social security impact intersect between the simulation and that observed in the survey.

With respect to the comparative tax imputations in 1981-82, the major discrepancies (beyond standard error estimates) occur for both elderly income unit types and both couples cohorts, with and without children. However, for childless couple income units, reference back to Table A2.13 indicates that this largely occurs because of the overestimate of private income inequality in the simulation.

Table A2.23: Comparison of Simulation with Surveys, Impact of Cash Transfers by Income Unit Type, Gini Coefficients: Survey Years

	1981-82			1985-86			1989-90		
	S_1[a]	S_2[b]	S_1/S_2[c]	S_1[a]	S_2[b]	S_1/S_2[c]	S_1[a]	S_2[b]	S_1/S_2[c]
Single <25									
SS[d]	.050	.041		.060	.057		.050	.044	
T[e]	.039	.041		.039	.037		.034	.037	
G[f]	.089	.082	109	.099	.094	105	.084	.081	104
Single 25-64									
SS[d]	.086	.087		.091	.089		.088	.089	
T[e]	.051	.047		.062	.063		.045	.060	
G[f]	.137	.134	102	.153	.152	101	.133	.149	89
Single 65+									
SS[d]	.581	.559		.565	.566		.552	.501	
T[e]	.024	.045		.033	.037		.032	.050	
G[f]	.605	.604	100	.598	.603	99	.584	.551	106
Couples without children, <65									
SS[d]	.048	.048		.057	.056		.050	.040	
T[e]	.054	.042		.058	.057		.046	.049	
G[f]	.102	.090	113	.115	.113	102	.096	.089	108
Couples without children, 65+									
SS[d]	.474	.466		.458	.452		.443	.381	
T[e]	.035	.055		.043	.059		.032	.070	
G[f]	.509	.521	98	.501	.511	98	.475	.451	105
Couples with children									
SS[d]	.026	.030		.036	.034		.033	.034	
T[e]	.049	.039		.054	.054		.036	.049	
G[f]	.075	.069	109	.090	.088	102	.069	.083	83
Single Parent									
SS[d]	.330	.340		.355	.337		.325	.309	
T[e]	.050	.052		.056	.063		.053	.053	
G[f]	.380	.392	97	.411	.400	103	.378	.362	104

Notes:
a) S_1 - Gini coefficient from simulation
b) S_2 - Gini coefficient from survey
c) S_1/S_2 - Simulation divided by survey (%)
d) SS = Social Security = Gini (Private) - Gini (Gross)
e) T = Income Tax = Gini (Gross) - Gini (Disposable)
f) G = Combined Tax-Social Security = Gini (Private) - Gini (Disposable)

Pleasingly, the 1985-86 results, which are the **only** ones based on the actual responses of survey participants for both social security and taxation, yield results that are extremely close.

For the 1989-90 comparison of taxation imputations, again the elderly income units reveal a significant discrepancy, although the results for singles aged 25-64 replace childless couples as a further specific concern. For the other income unit types,

representing some 40 per cent of the total population, the simulation and survey results are within reasonably close accord. These discrepancies in the tax imputations that do occur translate into the largest relative discrepancies in the impact of government redistributive measures. Nor, by reference back to Table A2.13, can they be explained by reference to discrepancies in private income inequality, although, as we have seen, at the disposable income level the discrepancies have largely disappeared in relative significance. Indeed, there is almost a lifecycle stage aspect to the quality of the simulated taxation imputation such that as people age and acquire a partner the discrepancy between the simulation-derived impact of the tax system and the revealed survey result worsens.

Social Wage Impact. Whilst the ABS Income Distribution Surveys provide a basis of comparison for the cash income concepts - private, gross and disposable - these surveys do not collect data on non-cash social wage expenditure items. To ascertain the validity of the simulation estimate of the impact of these, in particular, school education and health, we turn to the ABS fiscal incidence studies derived from the Households Expenditure Surveys.

For the 1988-89 HES, the ABS issued a data tape which included the imputed estimate of indirect government benefits. The results are published in ABS (1992) and White and Posselt (1992). The methodology in allocating such expenditure is similar to the methodology utilised in this simulation. Running the tape so as only to include those items of expenditure included in the simulation, vis. school education and health, the Gini coefficient at the disposable household income level (excluding self-employed) was reduced by .032 to that observable at the final household income level. Running the simulation for 1988-89 with the output module aggregated to the household level (excluding self-employed) produced the results that the introduction of the social wage (expenditure) items reduced the revealed Gini coefficient by.034 from that at the disposable household income level. The two results are sufficiently close to add support to the social wage simulation.

Summary. In summary then the simulation, for those years where verification (validation) is possible produces acceptable summary Gini measures of inequality for private gross, disposable and final (disposable + social wage expenditure) levels, particularly for 1985-86 and 1989-90. The result in 1981-82 is affected by the underestimate of private inequality although the taxation and social security imputations appear adequate. This adequacy holds even if we examine the results for each of the seven identified income unit types.

However, it must be acknowledged that despite this validation at an aggregate level, the result for the specific tax imputation in 1989-90 is disappointingly different from the imputation estimated for that year by ABS in its final release unit record tape. This is not to say that the microsimulation produces incorrect or false results but rather that the results produced by the consistent imputation used in the model differ from the results of the as yet undocumented ABS imputation.

Decile Share Comparison

Whilst the Gini Coefficient results are, in general, very close to either the actual surveys or other imputations particularly at the aggregate income concept levels, the Gini is only a summary measure of inequality. An even more stringent test, and one that might elucidate other areas of examination to further improve the model, is to examine the comparison of the shares of each form of income going to each decile as shown by the simulation and the survey results.

Disposable Income. Recalling that the direct taxation component of the disposable income concept for both the 1981-82 and 1989-90 'actual' survey results is, in fact, an imputation in each case rather than the actual data collected from the survey respondents, in Table A2.24 we present the comparison of the simulated and 'actual' disposable income shares for all non-self-employed income units. As previously, equivalent income is used, utilising the OECD scale.

In the upper part of the table, for each decile the estimated equivalent disposable income share is indicated for both the simulation and the 'actual' survey outcome, using the Saunders and Hobbes (1988) tax imputation in 1981-82 and the ABS imputation on the final 1989-90 unit record data tape. For each year of comparison, the absolute difference between the simulation and the actual is detailed. Thus, for the first decile in 1981-82, the simulation (reflecting all three cash-money imputations undertaken) indicated a share of 2.80 per cent, at the disposable income level. In comparison, the resultant 1981-82 'actual' or 'benchmark' result was 2.77 per cent, a difference of 0.03 per cent.

Before examining the results, though, it should be noted that the decile shares (by their nature) are inter-connected. Thus, if one decile's share is an overestimate of the actual, since the total must sum to 100 per cent, all other deciles' shares will be underestimated. Thus, for 1981-82 the over-estimate of 1.25 per cent in the anticipated share for the top decile in itself will result in the underestimates evident in the shares of the other deciles (with the exception of the first) to compensate for this. The key, therefore, is to look at the particular deciles where significant over- or underestimation occurs.

In that regard, it is clear from Table A2.24 that the 'deficiency' of the simulation lies in that over-estimate of the top decile. This confirms the argument above in respect of the Gini, and without reiterating that argument it is apparent that the simulation methodology did not adequately reflect the change in the salaries of this decile and in particular the change in the ownership of shares and hence dividend income in the 1981 to 1986 period (see Raskall, McHutchison and Urquhart, forthcoming). To a lesser extent, the simulation 'backdating' underestimated the share largely from marginal employment in the second and third deciles. Again, the use of averages, allocated across all deciles was inadequate to account for what would appear to be a larger burden of the intervening 1982-82 recession on the employment (possibly part-time or casual) of those families in these deciles. The disparities in the seventh

Table A2.24: Comparison of Simulation with Surveys, Disposable Income by Decile Shares (Non-self-employed Income Units; Equivalent Income, OECD Scale): Survey Years

Decile	1981-82 S_1[a]	S_2[b]	S_1/S_2[c]	1985-86 S_1[a]	S_2[b]	S_1/S_2[c]	1989-90 S_1[a]	S_2[b]	S_1/S_2[c]
1	2.80	2.77	+0.03	2.88	2.89	-0.01	2.89	2.70	+0.19
2	4.78	5.02	-0.24	4.93	4.92	+0.01	4.82	4.83	-0.01
3	5.48	5.72	-0.24	5.54	5.50	+0.04	5.46	5.53	-0.07
4	6.62	6.70	-0.08	6.51	6.45	+0.06	6.43	6.45	-0.02
5	8.03	8.08	-0.05	7.85	7.81	+0.04	7.72	7.69	+0.03
6	9.50	9.56	-0.06	9.42	9.43	-0.01	9.26	9.23	+0.03
7	11.14	11.33	-0.19	11.15	11.20	-0.05	10.96	11.10	-0.14
8	13.11	13.33	-0.22	13.22	13.32	-0.10	13.00	13.17	-0.17
9	15.72	15.90	-0.18	15.93	16.04	-0.11	15.61	15.78	-0.17
10	22.83	21.58	+1.25	22.56	22.45	+0.11	23.86	23.51	+0.35
				One-Digit Level					
1	2.8	2.8		2.9	2.9		2.9	2.7	
2	4.8	5.0		4.9	4.9		4.8	4.8	
3	5.5	5.7		5.5	5.5		5.5	5.5	
4	6.6	6.7		6.5	6.5		6.4	6.4	
5	8.0	8.1		7.8	7.8		7.7	7.7	
6	9.5	9.6		9.4	9.4		9.3	9.2	
7	11.1	11.3		11.1	11.2		11.0	11.1	
8	13.1	13.3		13.2	13.3		13.0	13.2	
9	15.7	15.9		15.9	16.0		15.6	15.8	
10	22.8	21.6		22.6	22.5		23.9	23.5	

Notes:
a) S_1 - Simulation result
b) S_2 - Result from survey (including alternate tax imputations)
c) S_1/S_2 - Absolute difference between simulation and survey results.

to ninth deciles may reflect a shift in the portion of remuneration paid in cash (salary) and non-cash (fringe benefits) forms between 1981 and 1986 (see Raskall, forthcoming b). At present the simulation does not incorporate such fringe benefits, so to the extent that more managers received a greater proportion of their salary in 1986 compared to 1981 in non-wage benefits then the model (based on cash or money salary) would underestimate the total salary received in 1981-82 and thus result in the apparent underestimate in these particularly applicable deciles. All of this suggests that 'fine-tuning' of the private income simulation by incorporation of more sophisticated indicators of intra-factor income, particular in the dividend and wages areas, and the broadening of the income concept to include non-cash fringe benefits would further improve the simulation.

The result for 1985-86, reflecting actual respondents estimates of social security payments received and taxation paid, shows strong correspondence between the simulation and the survey. The 'worst' absolute disparity of only 0.11 of one per

cent occurs at the extreme of the highest income deciles and could be reduced with 'fine-tuning' of the taxation concession and rebates in the imputation.

For 1989-90, it is again at the higher income deciles that the greatest disparity between the simulation and the survey data (incorporating ABS tax imputation) occurs. The simulation on this comparison would appear to underestimate the share of the seventh, eighth and ninth deciles by a combined total of 0.48 of one percentage point. However, this underestimate is put in better perspective when it is pointed out that in relative terms that represents an underestimate of 1.2 per cent of the 40.05 per cent estimated in the survey data for these deciles. Similarly the 0.35 percentage point overestimate by the simulation, in absolute terms, for the share of the tenth decile represents an 'error' of again only 1.5 per cent, in relative terms, from the revealed survey estimate of 23.51 per cent.

Table A2.24 indicates that, for the disposable income concept, the simulation and its survey-based equivalents produce close results. In fact, for the ten decile shares estimated for the three comparison years (a total of 30 comparisons) only in five does the simulation estimate vary from the survey estimate by more than 1.5 per cent in relative terms. The 'worst' absolute result for the top decile in 1981-82 of 1.25 percentage points is in error by 5.1 per cent in relative terms and is explainable by the overestimate of private income as above. The 'worst' relative result occurs in the bottom decile in 1989-90 where the simulation overestimates the share by 7.0 per cent in relative terms or a mere 0.19 percentage point from the survey estimate of 2.70 per cent, probably as a result of an overestimate of the take-up rate for social security benefits, or even the result of greater administrative investigation for eligibility in that year. As indicated by the bottom half of Table A2.22 most of the discrepancies disappear at the one-decimal point level. More particularly, in view of the use to which the simulation has been put in this paper, an examination of the results shows that, despite the limitations of the simulation already referred to, the direction of trend change between the years in the simulation in the share for each decile is overwhelmingly in accord with the survey results, with the few exceptions previously discussed.

Private Income. The analogous comparison in Table A2.25 between 'actual' and simulated **private** equivalent income, confirms the verisimilitude of the distributional outcomes by decile shares of the simulation, despite its acknowledged limitation. For 1981-82, in fact, if the 1.93 percentage point overestimate for the top decile were distributed amongst the other nine deciles in accordance with their share of private income, the underestimate discrepancies apparent in those deciles virtually disappear. Similarly for 1989-90, the 0.32 percentage point underestimate for the tenth decile, if distributed amongst the remaining in accord with their income share would substantially eliminate the overestimate in the fifth to ninth deciles. Thus, for both these years, improvement in the microsimulation, along the lines previously indicated, for the highest income recipients would further dramatically improve the overall'accuracy' of the distributional shares.

Table A2.25: Comparison of Simulation with Surveys, Private Income by Decile Shares (Equivalent Income, OECD Scale): Survey Years

Decile	1981-82 S_1[a]	S_2[b]	S_1/S_2[c]	1985-86 S_1[a]	S_2[b]	S_1/S_2[c]	1989-90 S_1[a]	S_2[b]	S_1/S_2[c]
1	0.00	0.00	-	0.00	0.00	-	0.00	0.00	-
2	0.19	0.15	+0.04	0.15	0.12	+0.03	0.19	0.26	-0.07
3	1.72	1.65	+0.07	1.31	1.21	+0.10	1.50	1.67	-0.17
4	5.42	5.46	-0.04	4.68	4.63	+0.05	4.83	4.85	-0.02
5	7.93	8.11	-0.18	7.64	7.66	-0.02	7.63	7.47	+0.16
6	10.04	10.29	-0.25	9.96	9.98	-0.02	9.91	9.72	+0.19
7	12.30	12.73	-0.43	12.39	12.41	-0.02	12.23	12.15	+0.08
8	14.87	15.44	-0.57	15.10	15.14	-0.04	14.94	14.85	+0.09
9	18.30	18.87	-0.57	18.74	18.79	-0.05	18.57	18.50	+0.07
10	29.23	27.30	+1.93	30.03	30.06	-0.03	30.20	30.52	-0.32
				One Digit Level					
1	0.0	0.0		0.0	0.0		0.0	0.0	
2	0.2	0.2		0.2	0.1		0.2	0.3	
3	1.7	1.7		1.3	1.2		1.5	1.7	
4	5.4	5.5		4.7	4.6		4.8	4.8	
5	7.9	8.1		7.6	7.7		7.6	7.5	
6	10.0	10.3		10.0	10.0		9.9	9.7	
7	12.3	12.7		12.4	12.4		12.2	12.1	
8	14.9	15.4		15.1	15.1		14.9	14.9	
9	18.3	18.9		18.7	18.8		18.6	18.5	
10	29.2	27.3		30.0	30.1		30.2	30.5	

Notes:
a) S_1 - Simulation result
b) S_2 - Result from survey (including alternate tax imputations)
c) S_1/S_2 - Absolute difference between simulated and observed results.

Direct Transfer System (Social Security and Taxation). Irrespective, as it stands, as highlighted by the lower part of Table A2.23, the simulation as currently calibrated 'works' well in replicating the trends between survey times in each decile, the exception being for the seventh to ninth deciles for the change between 1981-82 and 1985-86 which has been addressed above.

The comparison of the simulated to the 'actual' impact of direct government redistribution measures (recorded social security and taxation, imputed for both 1981-82 and 1989-90) as measured by the difference in the share of equivalent income for each decile is shown in Table A2.26. Aside from the 1985-86 data, the results of such a direct comparison are less satisfactory. They are, however, explainable.

Table A2.26: Comparison of Simulation with Surveys, Government Redistribution (Social Security and Tax) - Equivalent Income (OECD Scale) (i.e. D-P): Survey Years

Decile	1981-82			1985-86			1989-90		
	S_1	S_2	S_1/S_2	S_1	S_2	S_1/S_2	S_1	S_2	S_1/S_2
1	2.80	2.77	+0.03	2.88	2.89	+0.01	2.89	2.70	+0.19
2	4.59	4.87	-0.28	4.78	4.80	-0.02	4.63	4.57	+0.06
3	3.76	4.07	-0.31	4.23	4.29	-0.06	3.96	3.87	+0.10
4	1.20	1.24	-0.04	1.83	1.82	+0.01	1.60	1.60	-
5	0.10	-0.03	+0.13	0.21	0.15	+0.06	0.09	0.22	-0.13
6	-0.54	-0.73	+0.19	-0.54	-0.55	+0.01	-0.65	-0.49	-0.16
7	-1.16	-1.40	+0.24	-1.24	-1.21	-0.03	-1.27	-1.05	-0.22
8	-1.76	-2.11	+0.35	-1.88	-1.82	-0.06	-1.94	-1.68	-0.26
9	-2.58	-2.97	+0.39	-2.81	-2.75	-0.06	-2.96	-2.72	-0.24
10	-6.40	-5.72	-0.68	-7.47	-7.61	+0.14	-6.34	-7.01	+0.67
				One-Digit Level					
1	2.8	2.8		2.9	2.9		2.9	2.7	
2	4.6	4.9		4.8	4.8		4.6	4.6	
3	3.8	4.1		4.2	4.3		4.0	3.9	
4	1.2	1.2		1.8	1.8		1.6	1.6	
5	0.1	0.0		0.2	0.2		0.1	0.2	
6	-0.5	-0.7		-0.5	-0.5		-0.6	-0.5	
7	-1.2	-1.4		-1.2	-1.2		-1.3	-1.1	
8	-1.8	-2.1		-1.9	-1.8		-1.9	-1.7	
9	-2.6	-3.0		-2.8	-2.8		-3.0	-2.7	
10	-6.4	-5.7		-7.5	-7.6		-6.4	-7.0	

The 1985-86 result, it will be recalled, is the only result which relies on the respondents of survey participants for both social security receipts and taxation payments. Thus, the close comparability between the simulation and the survey, reflective also of the close comparability of private income suggests the validity of the imputations.

The 1981-82 and 1989-90 comparability is affected by two factors: the comparability of the base private income imputation, and the comparability of the imputations in fact utilised in the 'actual' results presented.

In respect of 1981-82, the overestimate for the tenth decile in private income share in the simulation (and consequent underestimate of other deciles) reflects itself in the resultant estimates of tax. Similarly, in respect on 1989-90, the underestimate of private income share in the tenth decile (and consequent overestimation in most other deciles) would reflect itself in the consequent estimated assessable tax liability. However, as has already been indicated, additionally, there is some concern with the ABS tax imputation incorporated in the unit record tape.

Decomposition of Discrepancy. These points are highlighted in Table A2.27, which decomposes the components of the total revealed discrepancy between the simulation and the 'actual' at the disposable income level. In view of the closeness of the fit we exclude the 1985-86 comparison and provide only that relating to 1981-82 and 1989-90.

In the first column the private income discrepancy, from Table A2.25, is detailed. The discrepancy attributable to the social security imputations as reflected in the difference between the decile percentage share of gross income and that, for each decile, of private income, is shown. The comparative difference in decile share between the disposable income share and the gross reflects the impact of the tax imputation. Obviously because tax is subtracted to arrive at disposable income the directional sign of any over- or underestimation is reversed. The sum of these three components reflects the total discrepancy at the disposable income level evidenced in Table A2.24 and shown in the final column.

Thus for 1981-82, from Table A2.27, it can be seen that the major source of the discrepancy apparent at the disposable income level for the highest six deciles (from fifth to tenth inclusive) stems from the private income level (although mitigated by the consequent discrepancy in the estimated taxation payable). For the other deciles, the major source of discrepancy occurs in the social security imputation.

The consistency of the change in direction of the discrepancy from the stronger underestimate of the simulation for the third decile to the overestimate at the ninth suggests the estimated take-up rates used for discretionary social security payments by income level could be fine-tuned. As it stands, improved verisimilitude would occur if more lower-income families claimed the allowances and less higher-income families. That is, the voluntary take-up rate schedule, as outlined in Appendix One, needs to be steeper in its tapering.

Table A2.27 indicates that for 1989-90, the source of discrepancy is more diverse. Conversely to 1981-82 above, there appears to be a consistent overestimate of social security benefits for lower-income families and underestimate for higher-income families. This suggests that the voluntary take-up rates by income level are too high for low-income families and conversely too low for higher-income families. The fact that the crossover occurs at approximately the median suggests that the overall base rate (see Appendix One) is not a poor estimate. This discrepancy accounts for the major source of 'error' in the first, eighth and ninth deciles. For the third, fifth and sixth deciles the primary source of discrepancy occurs at the private income level reflecting the margins of transition from welfare to work and from part-time to full-time work respectively.

Despite the apparent disparity between the tax imputation in the simulation and the tax imputation in the ABS unit record tape, commented upon previously, Table A2.27 indicates that it occurs most severely only in the top decile. There, the imputation applied in the simulation underestimates the apparent tax liability of the tenth decile by 0.95 percentage points, or approximately 25 per cent. In fact, if this

Table A2.27: Comparison of Simulation with Surveys, Component Imputation Sources of Discrepancy in Decile Shares: 1981-82 and 1989-90

Decile	Private Income	Social Security	Taxation	Total Discrepancy
1981-82				
1	-	+0.01	+0.02	+0.03
2	+0.04	-0.28	-	-0.24
3	+0.07	-0.31	-	-0.24
4	-0.04	-0.10	+0.06	-0.08
5	-0.18	+0.05	+0.08	-0.05
6	-0.25	+0.08	+0.11	-0.06
7	-0.43	+0.11	+0.13	-0.19
8	-0.57	+0.19	+0.16	-0.22
9	-0.57	+0.22	+0.17	-0.18
10	+1.93	+0.01	-0.69	+1.25
1989-90				
1	-	+0.22	-0.03	+0.19
2	-0.07	+0.17	-0.11	-0.01
3	-0.17	+0.23	-0.13	-0.07
4	-0.02	+0.13	-0.13	-0.02
5	+0.16	+0.03	-0.16	+0.03
6	+0.19	-0.04	-0.12	+0.03
7	+0.08	-0.10	-0.12	-0.14
8	+0.09	-0.15	-0.11	-0.17
9	+0.07	-0.21	-0.03	-0.17
10	-0.32	-0.28	+0.95	+0.35

discrepancy were distributed amongst the other deciles in accord with the number of taxpayers in each decile then the apparent minor overestimate of relative tax paid in the other nine deciles would virtually disappear. This suggests that the reasons for the discrepancy in the two tax imputations lies in the treatment of income received by, or largely unique to, the top decile.

Summary. Taken together the simulation undertakes in effect three specific imputations for the ten equivalent income deciles for the three survey comparable periods. That is, a total of 90 possible decile comparisons can be made with the results of actual survey (in 70 of the 90 cases) or other imputations incorporated in the 'actual' results (for 20 cases - taxation in 1981-82 and 1989-90). Despite possible sources of disparity highlighted earlier, the comparison reveals that in 24 cases the decile percentage income share estimated from the simulation is, on a relative basis, within 1 per cent of the revealed 'actual' imputation and over half are within 5 per cent.

If we exclude the other imputations so that comparison is solely with survey respondent results then one-third of the microsimulation imputations are within 1 per cent and two-thirds within 5 per cent. When it is recalled that many of the discrepancies by income share are linked to a discrepancy in one decile only, and

that discrepancies at one imputation level, such as private income, will translate into other levels, particularly tax, then this result is highly encouraging.

This outcome is all the more gratifying when we recognise that for many comparisons where the relative 'error' may appear large, the absolute discrepancy is minor. For instance, the 1981-82 simulation estimate for private income in the second decile would appear to be 26.67 per cent out when compared to the actual 1981-82 survey. The magnitude of such a disparity is reduced somewhat when it is revealed that the survey estimates 0.19 of one per cent as the private income share of that decile, compared to the 0.15 of one per cent estimated by the simulation - an absolute discrepancy of 0.04 percentage points. Over one-half of those decile estimates which are in discrepancy by more than 5 per cent in relative terms involve an absolute discrepancy of less than 0.1 of one percentage point.

The remaining source of major discrepancies revolves around the difference between the imputations for tax for 1989-90 between the ABS and the simulation.

In summary, when the distributional outcomes are examined on a decile equivalent income basis then the source of the discrepancy from the actual survey results (aside from minor fine-tuning as indicated above) stems either directly or in consequence of two results: the overestimate by the simulation of private income of the top decile in 1981-82; and the apparent underestimate of the taxation payments of the top decile in 1989-90 as compared with the ABS tax imputation.

The former occurs as a result of the inability of the microsimulation to predict the shift in share-ownership (and hence dividend income) between 1981-82 and 1985-86 (see Raskall, McHutchison and Urquhart, forthcoming) and changes within the distribution of wage and salary income in the period. The latter discrepancy is in fact not one of difference from **actual** survey recorded results but one stemming from the differences in two **imputations** of tax liability. For the remainder of the results the simulation produces outcomes which suggest that the results obtained would contain a high degree of validity.

A2.3 Living Standards (Mean Incomes) by Decile

At the risk of either labouring the point, or testing the simulation beyond endurance, the results of the microsimulation estimates of mean equivalent incomes for each decile can be compared, for each income concept, to the results revealed by actual survey outcomes. This serves not only to assess the validity of the living standard estimates utilised in the paper but also to highlight both the magnitude and source of major discrepancies which need to be addressed. In a sense such estimates combine both the aggregate outcomes considered in the first section of this paper **and** the distributional outcomes considered above. In view of the close relationship between the actual and the simulated 1985-86 results, we will concentrate upon the 1981-82 and 1989-90 'backdates' and 'forecasts'. For 1985-86, the 'worst' absolute result is a $4 a week (2 per cent) underestimate of the tax paid by the top decile.

Tables A2.28 and A2.29 outline, for each year (1981-82 and 1989-90), the difference both in nominal dollar absolute terms and in relative terms, the discrepancy between the simulated mean equivalent income for each decile and that revealed by either the appropriate income survey or imputation. In both tables, these differences are presented for each of the three money income concepts (private, gross and disposable) as well as the inferred receipt of social security payments (gross less private), payment of income tax (gross less disposable) and total government cash redistribution (disposable less private).

Perusal of the top-half of Table A2.28 confirms the close comparison between the simulation and the actual for the three income concepts for all but the top decile. Even the 31 per cent relative difference for the second decile of private income converts to an absolute difference of $37 per year or 70 cents a week. For the bottom nine deciles, the absolute disparity does not exceed $4 per week in any decile. However, for the tenth decile, the simulation overestimates private income by $2324 or 11 per cent, which accounts for 87 per cent of the overestimate of the mean by $268. If that discrepancy can be accounted for and corrected than the simulated distribution would be virtually identical to that revealed in the survey. We will not reiterate our belief that this stems from differential shifts within the labour market in executive salaries and remuneration compared to other employees and within the share market in respect of dividend income in the 1981-82 to 1985-86 period (see Raskall, McHutchison and Urquhart, forthcoming). Suffice to say this apparent deficiency in the model could be corrected by incorporating intra-factor inequality changes more fully.

The lower-half of Table A2.28 shows the nominal dollar value discrepancy between the simulated social security and tax imputations and the actual 1981-82 survey welfare payments and results using the Hobbes-Saunders tax imputations to the survey data. As can be seen, with the exception of the second to fourth deciles the results for social security differ by no more than $1.25 per week. Even for those exceptional second to fourth deciles where the difference climbs to as much as $4.50 per week, the heavy reliance of that group on social security payments means that the relative disparity is, at worst, 11 per cent. As indicated previously this could indicate that some 'fine-tuning' is required to the overall and income-differentiated take-up rates, where applicable.

The results for the tax imputation, all bar the top decile are in very close accord. For that tenth decile, the overestimate of $2324 in private income, taxed at the top marginal rate would more than account for the 18 per cent overestimate of tax in the simulation. Thus, the problem essentially revolves around the private income estimate for the tenth decile.

Analogous comparison is provided in Table A2.29 with respect to 1989-90. For private income, as reflected in the earlier results, the simulation provides reasonably good estimates in both relative and absolute terms for seven of the ten deciles. The other three are, however, worthy of comment. For deciles two and three the

Table A2.28: Comparison of Simulation with Survey Deciles, Mean Equivalent Income (Non-self-employed Population): 1981-82

Decile	Private (P) Absolute(S_1-S_2) $	Private (P) Relative(S_1/S_2) %	Gross (G) A[a] $	Gross (G) R[b] %	Disposable (D) A[a] $	Disposable (D) R[b] %
1	0	100	53	103	55	103
2	37	131	-145	96	-122	97
3	102	108	-132	97	-114	97
4	113	103	-15	100	19	100
5	69	101	24	100	57	101
6	70	101	19	100	66	101
7	-14	100	-81	101	-6	100
8	-56	100	-97	101	-10	100
9	36	100	-9	100	50	100
10	2324	111	2260	110	1194	107
Mean	268	103	190	102	117	102

	Social Security (G-P) $	Social Security (G-P) %	Tax (G-D) $	Tax (G-D) %	Government Redistribution (D-P) $	Government Redistribution (D-P) %
1	53	103	-2	80	5555	103
2	-182	95	-23	34	-159	96
3	-234	92	-18	83	-216	93
4	-128	89	-34	93	-94	85
5	-45	91	-33	97	-12	103
6	-51	83	-47	97	-4	100
7	-67	69	-71	96	4	100
8	-37	73	-83	97	46	102
9	-45	55	-59	98	14	100
10	-64	49	1066	118	-1130	120
Mean	-78	93	73	104	-151	127

Notes: a) A - Absolute Difference (Nominal $) between Simulated($S_1$) and Survey($S_2$), that is, S_1-S_2

b) R - Relative Difference (%) between Simulation(S_1) and Survey(S_2), that is, S_1/S_2.

simulation underestimates private income substantially in relative terms although given the low incomes received, not too dramatically in absolute terms. These low incomes (only $409 in the survey for decile two and $2383 for the third) suggest non-wage income (possibly interest) for the second and non-wage plus very limited casual work for the third. One possibility that suggests itself is older or retired people largely dependent upon a pension. With the imposition of deeming rules associated with the introduction of the assets test on pensions in 1985, banks over time introduced 'pensioner' accounts which provided interest at the 'deemed rate of

Table A2.29: Comparison of Simulation with Survey Deciles, Mean Equivalent Income (Non-self-employed Population): 1989-90

Decile	Private (P) A ($)	Private (P) R (%)	Gross (G) A ($)	Gross (G) R (%)	Disposable (D) A ($)	Disposable (D) R (%)
1	0	100	383	110	368	110
2	-115	72	168	102	166	102
3	-301	89	78	101	74	101
4	-124	98	164	102	193	102
5	95	101	320	103	323	103
6	108	101	245	102	375	103
7	-118	99	-60	100	193	101
8	-163	99	-119	100	222	101
9	-292	99	-268	99	311	101
10	-1355	97	-1333	98	1228	104
Mean	-225	99	-23	100	344	102

	Social Security (G-P)		Tax (G-D)		Government Redistribution (D-P)	
1	383	110	15	314	368	110
2	283	104	2	103	281	104
3	279	107	4	102	375	107
4	288	112	-29	97	317	121
5	225	126	-3	100	228	73
6	137	131	-130	95	267	88
7	58	123	-253	93	311	91
8	44	126	-341	93	385	92
9	24	130	-579	92	603	91
10	22	132	-2561	83	2583	83
Mean	202	110	-367	90	569	64

Notes: As for Table A2.28.

interest' rather than the non-interest-bearing accounts, colloquially called 'granny accounts' which existed previously. Thus, pensioners with small savings in these accounts may have experienced an increase in interest income in excess of the average over the period from 1985 to 1990. This would not be reflected in the methodology of the simulation, which assumed an equal average change.

Towards the upper deciles, and especially in the tenth decile, further underestimation by the simulation in absolute private income occurs. The underestimate in the tenth decile accounts for about half of the overall mean underestimation. In fact, the pattern of underestimation at this upper end reflects the distribution of dividend income amongst total private income deciles (see *Taxation Statistics*). This suggests that possibly the growth in paid-out dividends may have been larger than that

recorded in the National Accounts used in the simulation or that people with larger shareholdings received higher dividends than the average. Similarly, it is possible that managerial, professional and executive salaries increased faster than the average weekly earnings and certainly the ABS wages data showed increased inequality even amongst full-time employees (see Raskall, 1993).

The point is that again it is intra-factor inequality changes that account for the discrepancy and point the way to further improvement in the microsimulation. The related point is that changes in non-wage income from capital, whilst relatively small as a share of total income, are concentrated in particular deciles. Hence, their importance should not be overlooked given the overt dominance of wage incomes. (See Raskall, McHutchison and Urquhart, forthcoming, for an estimate of the significant contribution such investment income made to change in inequality in the 1984 to 1988-89 period.)

In relative terms, the gross and disposable income estimates appear reasonable, although some concern could be expressed with the extreme first and tenth deciles and the overall absolute discrepancies in the disposable income comparison. If we compare the social security imputation with the ABS unit record results, then it becomes clear that an overestimate has taken place. The consistency of the absolute discrepancy over the bottom five deciles suggests that this is family type rather than income-related. This would suggest that the average take-up rates estimates for the microsimulation are slightly overestimated. Credence is added to this interpretation by the fact that the government announced a campaign to advertise entitlements in the August 1990 Budget.

The tax imputation, which is compared not with the actual survey responses but the ABS tax imputation, is yet again disappointing on average. However, Table A2.29 reveals that for the first five deciles in absolute terms there is virtually no discrepancy between the simulation and the ABS. Even the next four deciles, whilst underestimates, are not too unrealistic in relative terms, particularly given the underestimates of private income. It is in the tenth decile that the simulation produces a result greatly at odds both in absolute and relative terms with the ABS imputation. The simulation underestimates actual tax paid by this decile by $2561 on average or 17 per cent. Whilst this underestimate also spills into the ninth decile results, the tenth alone accounts for almost 70 per cent of overall mean aggregate underestimate. Given that each decile has approximately 750,000 income units it is little wonder that the aggregate estimate of tax payable is substantially lower than the actual 1989-90 results, and that the redistributive impact is substantially less, as we noted earlier in this appendix.

Clearly, something exists between the imputations which is particularly concentrated in the top decile (but also to a lesser extent in the ninth decile) which produces these observed disparities. It is this that we now explicitly turn.

A2.4 1989-90 ABS Tax Imputations

It would be very easy to walk away from this discrepancy with the comment that they are just two imputations which happen to produce different outcomes and that, because there is not actual data we can compare them with, neither can be said to be more accurate than the other. But that would not do. The ABS imputation, because it is contained on the unit record tape will, whether it should or not, be used as the actual tax applicable in 1989-90, for a range of research with policy implications including estimation of the poverty line, and as the basis of new microsimulation development. That the simulation we have outlined here differs so dramatically and in so concentrated an area requires further investigation, particularly as we have already expressed some concerns in the earlier parts of this appendix. So with some trepidation we enter the 'field of eggshells'.

We have already noted that the tax data produced for the unit record tape are imputations only. That is, they are not the data collected from respondents in the survey. Whilst the same set of questions of respondents has been asked in all three income surveys in the 1980s, it was only in 1985-86 that this actual data was released.

The first point to note is the dramatic revision in the final version of the ABS imputation (released in March) compared to earlier versions. In Table A2.30 we present the comparison between the 'final' version and the latest pre-March version, by the various concepts and implicit social security and taxation, analogous to Table A2.29 above.

For the private income concept the difference of the mean in absolute terms is only $115 over the year. Just under half of this occurs in the third and tenth deciles ($231 and $292 respectively). As detailed in documentation outlining amendments and changes to the unit record tape, there are a number of explanations for this including reperturbation of the 38 per cent of records which originally received a constant $173 p.a. of interest income.

Similarly, at the gross income level, the difference is minor, totalling only $60 p.a. for the mean. Nearly half of this occurs at the tenth decile, but still totals less than $5.50 a week which is on a par with the disposable income change for this decile. Reference to the Social Security imputation in the lower part of the table shows the changes, whereby the alterations (upwards) of the disposable income in the lower deciles produced through the imputation corresponding decreases in social security entitlements. Thus, the upward revision of disposable income in the third decile ($231) was to a large extent countered by the reduced social security entitlement ($197) to produce the gross income disparity of only $34 p.a.

However, when comparison is made at the disposable income level, the mean of the March revision is $248 p.a. less than the previous version. More particularly examining the deciles, there is no significant change for the bottom nine deciles. For the tenth decile of highest-income recipients, the revised estimate is $2423 or 7 per cent less than the previous data.

Table A2.30: Comparison of Final with Earlier (Pre-March) ABS Versions: 1989-90

Decile	Private F[a]	Private E[b]	Private F-E	Private F/E	Gross F[a]	Gross E[b]	Gross F-E	Gross F/E	Disposable F[a]	Disposable E[b]	Disposable F-E	Disposable F/E
1	0	0	0	100	3827	3827	0	100	3809	3811	-2	100
2	404	280	124	146	6893	6878	15	100	6827	6817	10	100
3	2614	2383	231	110	8059	8025	34	100	7815	7780	35	100
4	7612	7490	122	102	9944	9930	14	100	9120	9118	2	100
5	11724	11663	61	101	12598	12575	23	100	10864	10858	6	100
6	15251	15183	68	100	15697	15644	53	100	13047	13029	18	100
7	19061	18982	79	100	19322	19260	62	100	15693	15675	18	100
8	23296	23218	78	100	23484	23404	80	100	18618	18638	-20	100
9	29024	28948	76	100	29150	29083	67	100	22307	22434	-127	99
10	47880	47588	292	101	47994	47708	286	101	33227	35650	-2423	93
Mean	15687	15572	115	101	17697	17637	60	100	14133	14381	-248	98

	Social Security F[a]	Social Security E[b]	Social Security F-E	Social Security F/E	Taxation F[a]	Taxation E[b]	Taxation F-E	Taxation F/E	Government F[a]	Government E[b]	Government F-E	Government F/E
1	3827	3827	0	100	18	16	2	113	3809	3811	-2	100
2	6489	6598	-109	98	66	61	5	108	6423	6537	-114	98
3	5445	5642	-197	97	244	245	-1	100	5201	5397	-196	96
4	2332	2440	-108	96	824	812	12	101	1508	1628	-120	93
5	874	912	-38	96	1734	1717	17	101	-860	-805	-55	107
6	446	461	-15	97	2650	2615	35	101	-2204	-2154	-50	102
7	261	278	-17	94	3629	3585	44	101	-3368	-3307	-61	102
8	188	186	2	101	4866	4766	100	102	-4678	-4580	-98	102
9	126	135	-9	93	6843	6649	194	103	-6717	-6514	-203	103
10	114	120	-6	95	14767	12058	2709	122	-14653	-11938	-2715	123
Mean	2010	2065	-55	97	3564	3256	308	109	-1554	-1340	-248	116

Notes: a) F - Outcome from Final ABS Unit Record File, issued March 1993.
b) E - Outcome from latest Earlier (Pre-March) ABS Unit Record File.

Virtually all (97.6 per cent) of the overall decrease occurs in this decile. Referring to the explicit change in tax, outlined in the lower part of the Table A2.30, the extent of this change and its concentration at the upper end is apparent. Revision to the tax imputation increased the apparent tax paid by 9 per cent, from $3256 to $3564 for the mean average.

We have already noted the impact of this aggregate change earlier. However, the distribution of the change is somewhat perturbing. For the top decile, the tax liability declined from $14767 to $12058, an absolute change $2709 or 22 per cent. This change 'spills over' to a far lesser extent into the eighth and ninth deciles where the change was 2 per cent and 3 per cent respectively. The net result, as indicated in the 'government' panels showing the combined impact of social security and

taxation, is that the mean impact increased by 16 per cent, including a 23 per cent increase in the top decile.

Referring back to Table A2.29 (comparing mean equivalent income of the simulation to the 'final' 1989-90 results), and concentrating on this taxation disparity, Table A2.31 compares the **simulation** outcome with the pre-March version produced by ABS, for gross income, tax imputation and resultant disposable income.

Unlike the comparison with the 'final' March version, the simulation and the earlier survey results are close. More significantly, the tax imputation for the errant top decile differs not by 22 per cent but by only 2 per cent. That absolute difference of $234 is well within the bounds of one standard error in the estimates. The 'worst' result is for the ninth decile where the absolute difference is $403 per annum or $8 per week.

To ensure that this is not a statistical quirk brought about by limiting the population to non-self-employed income units or by the use of equivalent income, in Table A2.32 we compare the mean decile incomes for gross and disposable income and tax from the unit record tape pre-March and the final version for unadjusted income and all income units.

Whilst Table A2.32 indicates some minor changes at the lower-end of the distribution in respect of gross income, it confirms the dramatic change, through tax paid, in the top decile. Tax imputed to the tenth decile increases by 21 per cent or a massive $4696 per annum (over $90 per week). The consequence is that disposable income falls by 7 per cent. For ease of interpretation we will concentrate on this unadjusted distribution by all income units from now on.

Whilst the ABS warned by letter first in July 1992 and in September 1992 that 'there were code errors in the period tax model', no indication was given as to why this was the case. In the letter accompanying the March 1993 release, it was claimed that the tax model was amended due to 'code errors'. However, there has been no documentation on either the original imputation codes used nor the amended codes which produced such a dramatic and concentrated change. The March letter does indicate though that the 'code amendments' affected only 1544 records or 5 per cent of the 30264 records in the sample. Given the apparent impact these must have been substantial amendments to those records. This certainly raises the general problem of the need to fully document and make available all imputation procedures if data is to be presented in imputed form and not based on actual survey responses.

The impact of these changes on the distributional outcome is not insignificant. In Table A2.33, the earlier (pre-March) and final outcomes in terms of Gini coefficient are compared for the equivalent income, non-self-employed population (the concept and population generally used in this report). In addition, the Ginis for the unadjusted income distribution for both the non-self-employed and total population

Table A2.31: Comparison of Simulation with Pre-March Unit Record Files, (Non-self-employed Population; Equivalent Income): 1989-90

	Gross				Tax Imputation				Disposable			
Decile	S_1[a]	S_2[b]	S_1-S_2	S_1/S_2	S_1[a]	S_2[b]	S_1-S_2	S_1/S_2	S_1[a]	S_2[b]	S_1-S_2	S_1/S_2
1	4217	3827	390	110	25	16	-11	156	4192	3811	381	110
2	7054	6878	176	103	57	61	-4	93	6997	6817	180	103
3	8143	8025	118	101	228	245	-17	93	7915	7780	135	102
4	10139	9930	209	102	811	812	-1	100	9328	9118	210	102
5	12925	12575	350	103	1733	1717	16	101	11192	10858	334	103
6	15947	15644	303	102	2514	2615	-101	96	13433	13029	404	103
7	19271	19260	11	100	3377	3585	-208	94	15894	15675	219	101
8	23359	23404	-45	100	4512	4766	-254	95	18847	18638	209	101
9	28878	29083	-205	99	6246	6649	-403	94	22632	22434	198	101
10	46889	47708	-819	98	12292	12058	234	102	34597	35650	-1053	97
Mean	17682	17637	45	100	3179	3256	-77	98	14503	14381	122	101

Notes: a) S_1 - Simulation Outcome 1989-90.
b) S_2 - ABS Outcome with Pre-March Unit Record File.

Table A2.32: Comparison of ABS Versions, Mean Decile Incomes (All Income Units; Unadjusted Income): 1989-90

	Gross				Disposable				Tax			
Decile	A[a]	B[b]	A-B	A/B	A[a]	B[b]	A-B	A/B	A[a]	B[b]	A-B	A/B
1	4321	4121	200	105	4262	4020	242	106	59	101	-42	58
2	8099	8024	75	101	7917	7836	81	101	182	188	-6	97
3	11460	11387	73	101	10770	10685	85	101	690	702	-12	98
4	15128	15058	70	100	13946	13830	116	101	1182	1228	-46	96
5	20037	19948	89	100	17440	17336	104	101	2597	2612	-15	99
6	51661	51509	152	100	39313	39454	-141	100	12348	12055	293	102
7	31896	31750	146	100	25579	25510	69	100	6317	6240	77	101
8	40111	40006	105	100	31461	31460	1	100	8650	8546	104	101
9	51661	51509	152	100	39313	39454	-141	100	12348	12055	293	102
10	87674	87579	95	100	60026	64626	-4601	93	27648	22952	4696	121
Mean	29591	29478	113	100	23184	23580	-396	98	6407	5898	509	109

Notes: a) A - Final 1989-90 Unit Record File, March 1993.
b) B - 1989-90 Unit Record File, Pre-March 1993.

Table A2.33: Comparison of Estimated Gini Coefficients Between Final ABS Unit Record File and Earlier Version: 1989-90

	Gross	Disposable	Tax (Absolute)	% Gross
Non-self-employed				
Equivalent				
Pre-March	.381	.336	.045	11.8
Final	.382	.324	.058	15.2
Difference	+.001	-.012	+.013	3.4
Unadjusted				
Pre-March	.428	.388	.040	9.3
Final	.429	.375	.054	12.6
Difference	+.001	-.013	+.014	3.3
All Income Units				
Unadjusted				
Pre-March	.435	.394	.041	9.4
Final	.433	.380	.053	12.2
Difference	-.002	-.014	+.012	2.8

of income units are presented. The comparison is of the Ginis for gross and disposable income, and the implicit taxation liability from the difference between the gross and disposable.

Table A2.33 indicates that with the amendments to the 'code errors in period tax model', the progressivity of the tax system as measured by its impact on reducing the Gini coefficient for gross income increased from .041 to .053 or about 30 per cent, for the unadjusted total income unit distribution. This is consistent for all populations, whether unadjusted or equivalent income is used.

Not only is the source of this change located in the top decile but it varies between income unit type as detailed in Table A2.34 which outlines the reduction in the Gini coefficient in both absolute and relative on application of the taxation imputation. For all cases, the amendments to the Gini at the gross income level from other changes are minor.

For couples with children, the apparent progressivity of the tax system with the amendments increases by almost 60 per cent from .032 to .050. In fact, the increase is most dramatic for all couple income units with or without children. On the other hand, for single person income units and sole parents the increase is not nearly as large. For singles aged under 25 years of age, the relative progressivity increases only by 2.6 per cent.

Table A2.34: Comparison of Reduction in Gini Coefficient from Tax (Pre-March and Final) by Income Unit Type (Unadjusted Income; All Income Units): 1989-90

Income Unit Type	Pre-March		Final		Change in Relative %
	Absolute (G-D)	Relative (G-D) ÷ G	Absolute (G-D)	Relative (G-D) ÷ G	
Single					
<25	.037	11.4	.038	11.7	2.6
25-64	.049	12.4	.060	15.2	22.6
65+	.047	15.2	.053	17.0	11.8
Couples without children					
<65	.035	10.1	.050	14.6	44.6
65+	.050	13.5	.072	19.4	43.8
Couples with children	.032	10.1	.050	16.1	59.4
Sole Parent	.049	13.4	.055	15.0	11.9
Total	.041	9.4	.053	12.2	29.8

The concentration of these changes in the top income tenth decile of each income unit type is confirmed by Table A2.35 which outlines the overall change in average tax and that for the top decile with the latter also expressed as a percentage of the total change.

Moreover, from Table A2.35, the concentration of this change occurs in the higher mean-income couple family types. In fact, in terms of the aggregate change noted in the earlier section of aggregate outcomes, 75 per cent of change occurs in couples under 65 with and without children, which comprise only 44 per cent of total family units. Within these specific groups, the top deciles, that is 4.4 per cent of all income units, were involved with 67.5 per cent of the total change in the tax imputation in aggregate terms. A further 2.7 per cent of income units in the top deciles of singles aged between 25 and 64 and couples over 65, were involved in an additional 21.8 per cent of the tax change. Thus, 7.1 per cent of all income units encompassed almost 90 per cent of the change in tax in the ABS imputation. These 7.1 per cent were all in the highest income categories.

So putting on our 'Sherlock Holmes' caps, let us see what we can deduce and/or infer from the above as to both the source of the change between the ABS imputation versions and, more importantly, the discrepancy that appears with the simulation used to produce the results in this report.

Table A2.35: Contribution of Change in Tenth Decile to Total Average Tax Imputation Change for Each Income Unit Type: 1989-90

Income Unit Type	Total Mean Increase	Tenth Decile	% Total
Single			
<25	-22	16	-
25-64	360	3235	89.9
65+	90	789	87.7
Couples without children			
<65	827	7079	85.6
65+	616	6248	101.4
Couples with children	953	8303	87.1
Sole Parent	134	1302	97.2
Total	509	4709	92.5

We know, from the above, that it is substantial in aggregate terms (about $3.9 billion), that it is highly concentrated amongst upper-income units, and particularly couples, and that, as a consequence, it dramatically affects the apparent progressivity of the income tax system. We can also infer that it involves something 'abnormal' and not part of a usual imputation.

Examination of the income survey data reveals that dividend income becomes a 'prime suspect'. Over half of dividend recipients are in the upper quintile of income units ranked by gross income, including 36 per cent in the tenth decile. Moreover, the average value of that income received also increased dramatically by decile such that the tenth decile of income units, ranked by gross income receives 82.4 per cent of all dividend income. The ninth receives a further 7.5 per cent. This accords with the contribution of change in the tenth decile to the total tax imputation change as revealed in Table A2.35.

Moreover, 35 per cent of recipient income units (receiving 45 per cent of dividend income) are couples with children and a further 37 per cent (encompassing 38 per cent of dividend income) are childless couples. This corresponds to the income unit typology associated with the discrepancy noted above.

Finally, only 8.7 per cent of income units received dividend income which accords with our inference above that 90 per cent of the discrepancy involved some 7.7 per cent of income units.

Most significantly, the total amount of dividend income was $6.5 billion which would suggest tax revenue which is similar in magnitude to the $3.9 billion involved in the tax imputation discrepancy given likely average tax rates applicable to the

recipients of such dividends. Indeed, the March documentation indicates an amendment to private income involving $223 million as a consequence of previous double-counting of some income from private limited liability companies, as dividend income.

Not only is dividend income the most likely income source for this discrepancy but a substantial change in the taxation of dividends occurred between 1985-86 and 1989-90. This was the introduction from the 1987-88 taxation year for dividend income of 'dividend imputation' (see Appendix One). As may be expected, this decision has a great impact on the apparent progressivity of the tax system given the concentration of dividend income in the highest income earners. It is indeed one of the strengths of the microsimulation approach that this can be ascertained by running the simulation with dividend imputation included and then running it again with dividends treated like all other forms of income. This has been done for the three years of the simulation period for which dividend imputation existed: 1987-88; 1988-89 and 1989-90. The results are presented in Table A2.36.

If progressivity of the tax system is measured by the percentage reduction in the Gini coefficient at the disposable income level compared to the Gini coefficient at the gross income level then dividend imputation reduced apparent progressivity by 9 per cent in its first year of introduction 1987-88 and in 1989-90 and by about 15 per cent in 1988-89.

If the population is limited to that utilised for the simulation in this report, that is by excluding self-employed income units, then the apparent impact is even larger. The simulation, run to exclude dividend imputation (that is, dividends treated and taxed like other forms of income) for 1989-90 indicates that the personal income tax system would reduce inequality as measured by the Gini coefficient by .047 from .416 to .369. However, with dividend imputation included, the impact of inequality of the tax system is reduced to .041 as the Gini falls from .416 to .376 at the disposable income level. This implies a reduction in the progressivity as measured by the Okner index of 15 per cent.

Compare these to the changes recorded in the different versions of the ABS unit record tape incorporating the tax imputation pre-March and the final version for 1989-90 as detailed in Table A2.33. For the unadjusted distribution for all income units, the change in the Gini coefficient with the addition of tax increased from .041 to .053, that is .012. This is roughly double the apparent effect of dividend imputation. Limiting the population to non-self-employed income units, the change in the impact of the tax imputation contingent on the revision increases by .014, from .040 to .054. Again, this is slightly less than double the comparable impact of dividend imputation noted above.

To examine this apparent relationship in the discrepancy, it is instructive to run through the mechanics of dividend imputation, again.

Table A2.36: Impact of Dividend Imputation, Gini Coefficients (All Income Units; Unadjusted Income): 1987-88 to 1989-90

	With	Without	Difference	% Tax (Without)
A: Income Units				
1987-88				
Private	.521	.521	-	-
Gross (G)	.425	.425	-	
Disposable (D)	.385	.380	-.005	-
Tax (G-D)	.040	.045	+.005	+11.1
1988-89				
Private	.521	.521	-	-
Gross	.428	.428	-	-
Disposable	.395	.389	-.006	
Tax	.033	.039	+.006	+15.4
1989-90				
Private	.515	.515	-	-
Gross	.421	.422	-	-
Disposable	.379	.375	-.005	
Tax	.042	.047	+.005	+10.6
B: Non-self-employed				
1987-88				
Private	.532	.532	-	-
Gross (G)	.419	.419	-	-
Disposable (D)	.377	.372	-.005	
Tax (G-D)	.042	.047	+.005	+10.6
1988-89				
Private	.529	.529	-	-
Gross (G)	.419	.419	-	-
Disposable (D)	.384	.377	-.007	-
Tax (G-D)	.035	.042	+.007	+16.7
1989-90				
Private	.526	.526	-	-
Gross (G)	.416	.416	-	-
Disposable (D)	.375	.369	-.006	-
Tax (G-D)	.041	.047	+.006	+12.8

If dividend imputation did not exist, then for every $100 of dividend income received, it would be treated like income from any other source and that marginal taxable income would be subject to tax at the appropriate rate. Since most dividend recipients are in the top decile of income recipients then that rate is likely to be 49 per cent. This would imply that the additional tax on the $100 of dividend income would be $49.

That is,

(1) Tax = 0.49 (100)
= 49

Under dividend imputation, all dividend income for which the full company tax rate (39 per cent in 1989-90) has not been paid is subject to personal income tax like any other source of income. However, if the full rate has been paid by the corporation it can issue these dividends as 'franked dividends'. These dividends which comprised 89 per cent of all dividends paid in 1989-90 (Commissioner of Taxation, 1989-90) carry with them an 'imputation credit' (which is effectively a pre-payment of the company tax) valued at:

(2) Imputation Credit (IC) = $\frac{b}{1 - b}$ x (Value of Franked Dividends)

where b = the company tax rate (0.39 in 1989-90)

Thus, in 1989-90 each $100 of dividend income received would, on average, carry an imputation credit of:

(3) IC = $\frac{0.39}{1 - 0.39}$ x (0.89 x 100)

where 0.39 is the company tax rate and 0.89 is the proportion of all dividends which were franked (from the Taxation Statistics)

then, for each $100 of dividend income:

IC = $57

This credit is then added to the $100 for taxable income purposes, such that income would be increased by $157. This, following the above, would be subject to tax at the appropriate marginal rate (of the recipient (generally 0.49), so the additional apparent tax liability would be:

(4) Apparent Tax = 0.49 x (100 + 57)
= 77 = 49 + 28

That is, the apparent tax liability would have risen from $49 (determined above) to $77, an apparent increase of $28 per $100 of dividend income received, with dividend imputation.

However, to determine the actual tax paid, the imputation credit (being a credit for the company tax paid at the company level) is the **subtracted** from the assessed apparent tax liability.

(5) Actual Tax Paid = 77 - 57
= 20 = 49 - 29

That is, the actual tax paid on the $100 of dividend is $20 or $29 **less** than would have been payable if dividend imputation had not applied and dividends were subject to income tax liability in the same way as any other source of income.

The reason why some tax has been paid ($20) on the dividend income and it is not 'tax-free in the hands of shareholders' is: firstly, not all of the dividends were subject to the imputation credit or rebate in that they were not fully franked (about 9 per cent), and secondly, the value of the credit reflected the company tax rate of 0.39 in 1989-90 which was less than the assumed personal marginal tax rate of 0.49. In both 1987-88, when the scheme was introduced and in the 1988-89 personal income tax year, the applicable company tax rate for imputation credits was 0.49, the same as the top marginal tax rate. Hence, for fully franked dividends, in those years the dividend income was 'effectively tax-free'.

In this regard it should be noted that whilst the actual value of franked dividend income received is regarded as income under both the income tax and social security systems, the attaching imputation credits - which are not received in cash - are not income for social security purposes. However, in incorporating them in assessable income for income tax liability purposes as in the first stage of the exercise above, then the Medicare levy based on that assessable income incorporates the imputation credits. To the extent that the Medicare levy is considered as part of the tax system, dividend income can never be totally tax-free.

Now, to recapitulate, from the above equations (1), (4) and (5), we can observe the outcome of the introduction of tax imputation in Table A2.37.

The key point of Table A2.37 is apparent if we look at the likely tax revenue implications in the final set of equations. With dividend imputation, **actual tax paid** will decline by $29 for every $100 of dividends, but **apparent tax liability** (without applying the countering imputation **rebate**) will result in an apparent increase in tax of $28 for every $100 of dividends, compared to the situation where no dividend imputation scheme existed.

Given the concentration of dividend recipients in the top decile of each income unit type and overall (from Table A2.35) clearly which concept is used will have major implications of the overall progressivity of the tax system.

Thus, referring back to Table A2.36 above, when the simulation was re-run, excluding dividend imputation (concept A: equation (1)), then the Gini change contingent upon the tax system (the difference between gross and disposable) was such as to increase the apparent impact of tax from 0.042 to 0.047 for all income units (unadjusted distribution) in 1989-90. Conversely, if the apparent tax liability (concept B) only were to be used then the apparent tax paid by particularly the top decile would **increase** by about the amount which, in the earlier situation, it

Table A2.37: Illustrative Tax Implications of Dividend Imputation

Concept	Basis (Equation)	Tax
A. No Dividend Imputation	1	T = T = 49
B. Apparent Tax Liability	4	T' = T + 28 = 77
C. Actual Tax Paid	5	T'' = T - 29 = 20

decreased. The likely impact on apparent progressivity of the tax system, compared to the situation where no dividend imputation existed, would be to increase the apparent tax effect on the Gini above that situation by the roughly amount that it would otherwise have reduced it. That is, from 0.047 to 0.052. The difference between the apparent impact of the Gini for concepts B and C would thus be about double the apparent effect of excluding dividend imputation.

As detailed in Table A2.33 and commented above, this is very close to the outcome the ABS imputation arrives at in its revised final version. Indeed, compared to the pre-March version the change in the Gini Coefficient with the addition of tax increased from 0.041 to 0.053.

It is apparent that ABS for its final version of tax imputation has decided on concept B, a very literal interpretation of apparent tax liability which does not reflect the actual tax paid. Further confirmation is provided by consideration of the quantum amount of imputed apparent tax paid in Table A2.32, or more particularly, the change to it.

With approximately $6000 million in dividend income as revealed in the survey, from Table A2.37 a difference approximating $3762 million might be anticipated. The actual difference in total tax of about $3440 million is reasonably close given other changes stemming from coding errors, including the $223 million referred to above.

The implication of the conceptual basis for ascertaining tax is that apparently far from benefiting from the introduction of dividend imputation, shareholders in receipt of such income would appear to pay more tax than previously. Given their location in the overall distribution this in turn increases the apparent progressivity of the tax system over what it might otherwise have been in the light of other changes to rates and thresholds.

More particularly, an imputation based on an assumption that shareholders effectively bear the entire burden of company tax stands at odds with other analysis (Warren, 1989 and 1992) which traditionally assumes some proportionate sharing of the company tax burden between shareholders and consumers (in the form of higher prices).

It also stands at odds with the 1985-86 IDS survey which in utilising actual respondents' data on actual tax paid is more consistent with concept C, on which the microsimulation which underlies the results in this paper is based.

Whilst arguably the ABS is attempting to produce a more accurate imputation of apparent tax liability for 1989-90, researchers should be aware of the changes in concept for comparative work, examining for example disposable income (after-tax) over time and the implications that the liability concept has, when compared to other actual or imputed results based on actual tax paid.

With these concerns about the ABS data, we feel more confident that the imputation basis adopted for the purposes of the microsimulation has the advantage of consistency in treatment over time and on the basis of the earlier version of the ABS tape appears to be validated on a comparison based on the same conceptual base (that is, actual tax paid by individuals).

However, as discussed in Section 4, the issue raises deeper methodological issues regarding the treatment of substantial alterations to the structure of the entire tax system over time. Whilst not addressed in the imputations, either for the purpose of this report or by ABS, arguably the introduction of fringe benefit tax and an explicit capital gains tax, if incorporated, would raise similar dilemmas and concerns. Arguably they can only be resolved if **all** forms of income and **all** forms of taxation are ultimately included in full incidence studies, with explicit conceptual and operational assumptions detailed and sensitivity analyses undertaken.

A2.5 Conclusion

In conclusion, aside from the concerns which we have with the 1989-90 tax imputation and particularly in regard to the ABS imputation, the results of this extensive validation exercise lend support to the proposition that the results obtained from the microsimulation provide a valid basis for confirming the trends and changes reported.

The sole major area of concern is with the private income imputation in 'backdating' the estimates from the 1985-86 base to 1981-82. Here, particularly for the tenth decile, the results obtained seem to confirm the concerns expressed regarding the capacity of the micro-simulation, as currently formulated, to encompass changes **within** factor markets and sub-markets particularly in respect of dividends and wages. It is for that reason that in utilising an explicit time series set of annual results for inequality researchers are directed to what we have termed the 'quasi-simulation' results, discussed in Section 4. This set, utilising the actual trend changes in private income inequality for the 1981-82 to 1985-86 period and the 'grafting' variations about this trend revealed by the simulation on the basis of changes between years in average income components and employment levels, represents the current 'preferred and best' explicit set of inequality measures we have derived. As work continues on refinement of the simulation procedures to more fully incorporate this within-factor market aspects, the 'quasi' prefix will ultimately be dropped.

References

Aaron, H. (1977), 'Comments', in C. Campbell, ed., *Income Redistribution*, Proceedings of a Conference sponsored by the American Enterprise Institute for Public Policy Research and Hoover Institute on War, Poverty and Peace, Washington D.C., 210-13.

Atkinson, A. (1993), *What is Happening to the Distribution of Income in the U.K.?*, Welfare State Program Discussion Paper WSP/87, STICERD, London School of Economics, London.

Australian Bureau of Statistics (ABS) (1980), *Social Indicators, Australia*, Catalogue No. 4101.0, ABS, Canberra.

Australian Bureau of Statistics (ABS) (1987), *1984 Household Expenditure Survey, Australia: The Effects of Government Benefits and Taxes on Household Income*, Catalogue No. 6537.0, ABS, Canberra.

Australian Bureau of Statistics (ABS) (1989), *Australian National Accounts: Input-Output Table 1983-84*, Catalogue No. 5209.0, ABS, Canberra.

Australian Bureau of Statistics (ABS) (1990), *1988-89 Household Expenditure Survey, Australia: Summary of Results*, Catalogue No. 6530.0, ABS, Canberra.

Australian Bureau of Statistics (ABS) (1992), *1988-89 Household Expenditure Survey: The Effects of Government Benefits and Taxes on Household Income*, Catalogue No. 6537.0, ABS, Canberra.

Australian Bureau of Statistics (ABS) (1992a), *1988-89 Household Expenditure Survey: The Effects of Government Benefits and Taxes on Household Income*, Technical Paper, ABS, Canberra.

Australian Bureau of Statistics (ABS) (various years), *Australian National Accounts*, Catalogue No. 5204.0.

Australian Bureau of Statistics (ABS) (various years), *Commonwealth Government Finance*, Catalogue No. 5502.0.

Australian Bureau of Statistics (ABS) (various years), *Consumer Price Index*, Catalogue No. 6401.0.

Australian Bureau of Statistics (ABS) (various years), *Expenditure on Education, Australia*, Catalogue No. 5510.0.

Australian Bureau of Statistics (ABS) (various years), *Government Finance Statistics, Australia*, Catalogue No. 5512.0.

Australian Bureau of Statistics (ABS) (various years), *Government Schools Australia, National Schools Statistics Collection*, Catalogue No. 4215.0.

Australian Bureau of Statistics (ABS) (various years), *Labour Force Status and Other Characteristics of Families*, Catalogue No. 6224.0.

Australian Bureau of Statistics (ABS) (various years), *Non-Government Schools, Australia, National Schools Statistics Collection*, Catalogue No. 4216.0.

Australian Bureau of Statistics (ABS) (various years), *Schools, Australia*, Catalogue No. 4221.0.

Australian Bureau of Statistics (ABS) (various years), *Schools, National Schools Statistics Collection*, Catalogue No. 4202.0.

Australian Bureau of Statistics (ABS) (various years), *Social Indicators,* Catalogue No. 4101.0.

Australian Bureau of Statistics (ABS) (various years), *State and Local Government Finance, Australia,* Catalogue No. 5504.0.

Bean, C. (1991), 'Are Australian attitudes to government different?: a comparison with five other nations', in F. Castles, ed., *Australia Compared: People, Policies and Politics,* Allen and Unwin, Sydney, 74-100.

Blinder, A. and H. Esaki (1978), 'Macroeconomic activity and income distribution in the postwar United States', *Review of Economics and Statistics,* 33(4), November, 329-37.

Box, S. (1987), *Recession, Crime and Punishment,* McMillan, London.

Bradbury, B. (1990), *Unemployment, Participation and Family Incomes in the 1980s,* SPRC Discussion Paper No. 24, Social Policy Research Centre, University of New South Wales, Sydney.

Bradbury, B. and J. Doyle (1992), *Family Incomes and Economic Growth in the 1980s,* SPRC Reports and Proceedings No. 102, Social Policy Research Centre, University of New South Wales, Sydney.

Bradbury, B., J. Doyle and P. Whiteford (1990), *Trends in the Disposable Incomes of Australian Families, 1982-83 to 1989-90,* Discussion Paper No. 16, Social Policy Research Centre, University of New South Wales, Sydney.

Bradshaw, J. (1993), 'Audit of an era: the impact on inequality of social policies under Thatcher', in P. Saunders and S. Graham, eds, *Beyond Economic Rationalism: Alternative Futures for Social Policy,* Proceedings of a Joint Conference with the Department of Social Work and Social Administration, University of Western Australia, 27 November 1992, SPRC Reports and Proceedings No. 105, Social Policy Research Centre, University of New South Wales, Sydney, 77-102.

Braithwaite, J. (1978), 'Unemployment and adult crime: an interpretation of the international evidence', in *Unemployment and Crime,* Proceedings of the Institute of Criminology, No. 36, Sydney University, 54-71.

Brownlee, H. (1990), *Measuring Living Standards,* Australian Living Standards Study Paper No. 1, Australian Institute of Family Studies, Melbourne.

Brownlee, H. and A. King (1991), 'The estimated impact of the Family Package on child poverty', in D. Edgar, D. Keane and P. McDonald, eds, *Child Poverty,* Allen and Unwin, Sydney, 123-45.

Commissioner of Taxation (1981-82 to 1990-91), *Taxation Statistics,* AGPS, Canberra.

Commonwealth of Australia (various years), *Budget Paper No. 1,* AGPS, Canberra.

Cowell, F. (1977), *Measuring Inequality,* Philip Adam, Oxford.

Devery, C. (1991), *Disadvantage and Crime,* NSW Bureau of Crime Statistics and Research, Sydney.

Economic Planning and Advisory Council (EPAC) (1987), *Aspects of the Social Wage: A Review of Social Expenditures and Redistribution,* Council Paper No. 27, AGPS, Canberra.

Gallagher, P. (1990), 'Australian tax benefit and microsimulation models: an overview', in B. Bradbury, ed., *Tax Benefit Models and Microsimulation Methods: Proceedings of a Workshop held on 1 June 1990 of the University of New South Wales,* SPRC Reports and Proceedings No. 87, University of New South Wales, Sydney, 29-78.

Gregory, R. (1992), 'Aspects of Australian labour force living standards: the disappointing decades 1970-1990', paper presented to the 21st Conference of Economists, University of Melbourne, July 1992.

Gregory, R.G. (1993), 'Aspects of Australian and US living standards: the disappointing decades 1970-1990', *Economic Record,* 69, March, 61-76.

Haig, R.M. (1921), 'The concept of income: economic and legal aspects', in R.M. Haig, ed., *The Federal Income Tax,* Columbia University Press, New York, 40-57.

Harding, A. (1984), *Who Benefits? The Australian Welfare State and Redistribution,* SWRC Reports and Proceedings No. 45, Social Welfare Research Centre, University of New South Wales, Sydney.

Harding, A. (1992), 'Income distribution and redistribution across the lifecycle in Australia, in P. Raskall and P. Saunders, eds, *Economic Inequality in Australia, Vol 1, Government and Redistribution,* Proceedings of the Inequality in Australia Conference, SSEI Monograph No. 1, Centre for Applied Economic Research and the Social Policy Research Centre, University of New South Wales, Sydney, 75-108.

Harding, A. (1993), 'New estimates of poverty and income distribution in 1990: the effects of reweighting the 1990 Income Distribution Survey', in P. Saunders and S. Shaver, eds, *Theory and Practice in Australian Social Policy: Rethinking the Fundamentals,* Proceedings of the National Social Policy Conference, Sydney, 14-16 July 1993, Volume 2: Contributed Papers, SPRC Reports and Proceedings No. 112, Social Policy Research Centre, University of New South Wales, Sydney, 203-24.

Harding, A. and D. Mitchell (1992), 'The efficiency and effectiveness of the tax-transfer system in the 1980s,' *Australian Tax Forum,* 9(3), 277-304.

Hewson, J. (1992), Alfred Deakin Memorial Lecture, as reprinted in *Australian Financial Review,* 16 October 1992.

Kaspuscinski, C.A., B. Chapman and J. Braithwaite (1991), *Unemployment and Crime: Resolving the Paradox,* paper prepared for the Criminology Research Council, June.

King, A. (1987), *The Distribution of Current Disposable Incomes: An Estimation Using Techniques of Microanalytic Simulation,* NEIR Working Paper No. 1, National Institute for Economic and Industry Research, Melbourne.

King, J.E., R.J. Rimmer and S.M. Rimmer (1991), *The Law of the Shrinking Middle: Inequality of Earnings in Australia, 1975-1989,* Discussion Paper 17/91, Department of Economics, School of Economics and Commerce, La Trobe University.

Lombard, M. (1991), *An Examination of Income Distribution in Australia 1989-90,* Research Paper No. 340, School of Economic and Financial Studies, Macquarie University.

McHutchison, J. and R. Urquhart (1992), 'Trends in the social wage: The Social Wage Project', in P. Raskall and P. Saunders, eds, *Economic Inequality in Australia, Volume 1: Government and Redistribution*, Proceedings of the Inequality in Australia Conference, SSEI Monograph No. 1, Centre for Applied Economic Research and the Social Policy Research Centre, University of New South Wales, Sydney, 109-22.

McHutchison, J. and P. Raskall (1992a), 'Contribution of life cycle factors to economic inequality', paper presented to Third National Social Research Conference, Sydney, 29 June - 2 July 1992.

National Health Strategy (1992), *Enough to Make You Sick: How Income and Environment Affect Health*, Research Paper, No. 1, National Health Strategy.

Nevile, J.W. (1990), 'The effects of macroeconomic policy on income distribution: experience in the 1970s and 1980s', in Economic and Social Policy Group, *Income Distribution Seminar*, Papers and Proceedings, 12-20.

Nevile, J., N. Podder, B. Tran-Nam and N. Warren (1988), *Inflation, Anti-Inflationary Policy and the Distribution of Income in Australia*, CAER Working Paper No. D1, Centre for Applied Economic Research, University of New South Wales, Sydney.

Nevile, J. and B. Tran-Nam (1992), 'Factors causing inequality in earnings between men and women', in P. Raskall and P. Saunders, eds, *Economic Inequality in Australia, Volume 2: Some Factors Causing Inequality*, Proceedings of the Inequality in Australia Conference, SSEI Monograph No. 2, Centre for Applied Economic Research and the Social Policy Research Centre, University of New South Wales, Sydney, 49-62.

Nolan, B. (1987), *Income Distribution and the Macroeconomy*, Cambridge University Press, Cambridge, England.

Nolan, B. (1988), 'Macroeconomic conditions and the size distribution of income: evidence from the United Kingdom', *Journal of Post-Keynesian Economics*, 11(2), Winter, 196-221.

Norris, K. (1985), 'Taxes transfers and the social wage in Australia, 1975-1984', *Australian Bulletin of Labour*, 11(4), September, 212-35.

Norris, K. (1990), *The Social Wage and Living Standards 1982-88*, Discussion Paper No. 7, Public Sector Research Centre, University of New South Wales, Sydney.

Okner, B.A. (1966), *Income Distribution and the Federal Income Tax*, Michigan Institute of Public Administration, Ann Arbor.

Organisation for Economic Co-operation and Development (OECD) (1982), *The OECD List of Social Indicators*, OECD, Paris.

Paglin, M. (1980), *Poverty and Transfers In-Kind*, Hoover Institution, Stanford.

Papadakis, E. (1990), *Attitudes to State and Private Welfare: Analysis of Results from a National Survey*, SPRC Reports and Proceedings No. 88, Social Policy Research Centre, University of New South Wales, Sydney.

Pech, J. (1986), *The 'Greatest Asset Since Child Endowment'?: A Study of Low-Income Working Families Receiving Family Income Supplement*, Social Security Review, Background/Discussion Paper No. 9, Department of Social Security, Canberra.

Perkins, J. (1991), 'Patterns of household expenditure', *National Economic Review*, 14, January, 40-6.

Pissarides, C. and G. Weber (1989), 'An expenditure-based estimate of Britain's black economy', *Journal of Public Economics*, 39(1), June, 17-32.

Raskall, P. (1992a), *Social Justice: Beyond the Rhetoric*, paper presented to Social Justice and the Economy Conference, SACOSS and SATLC, Adelaide, February, 1992.

Raskall, P. (1992b), 'Inequality in Australia: what we know and what we don't', in P. Raskall and P. Saunders, eds, *Economic Inequality in Australia, Volume 1: Government and Redistribution*, proceedings of the Inequality in Australia Conference, SSEI Monograph No. 1, Centre for Applied Economic Research and the Social Policy Research Centre, University of New South Wales, Sydney, 1-34.

Raskall, P. (1993), 'Widening income disparities in Australia', in S. Rees, G. Rodley and F. Stilwell, eds, *Beyond the Market: Alternatives to Economic Rationalism*, Pluto Press, Australia, 38-52.

Raskall, P. and J. McHutchison (1992a), *Economic Inequality in Australia: A Life-Cycle Approach*, Working Paper No. 4, Study of Social and Economic Inequality, Centre for Applied Economic Research, University of New South Wales, Sydney.

Raskall, P. and J. McHutchison (1992b), *Changes in Income Inequality in Australia in the 1980s: A Lifecycle Approach*, Working Paper No. 6, Study of Social and Economic Inequality, Centre for Applied Economic Research, University of New South Wales, Sydney.

Raskall, P. (forthcoming a), *Perks of the Job: The Distribution of Non-cash Wage Income in Australia in the 1980s*, Study of Social and Economic Inequality, Centre for Applied Economic Research, University of New South Wales, Sydney.

Raskall, P. (forthcoming b), *Trends in Economic Inequality: A Data Compendium*, Working Paper No. 12, Study of Social and Economic Inequality, Centre for Applied Economic Research, University of New South Wales, Sydney.

Raskall, P., J. McHutchison and R. Urquhart (forthcoming), *Decomposition of Inequality Change in Australia 1984-1989: The Relative Contribution of Demographic and Economic Factors*, SSEI Monograph No. 3, Centre for Applied Economic Research and the Social Policy Research Centre, University of New South Wales, Sydney.

Saunders, P. (1992a), *Longer Run Changes in Distribution of Income in Australia*, Working Paper No. 3, Study of Social and Economic Inequality, Centre for Applied Economic Research, University of New South Wales, Sydney.

Saunders, P. (1992b), *Poverty, Inequality and Recession*, Working Paper No. 5, Study of Social and Economic Inequality, Centre for Applied Economic Research, University of New South Wales, Sydney.

Saunders, P. (1992c), 'Non-cash income and relative poverty in comparative perspective: evidence from the Luxembourg Income Study', in P. Raskall and P. Saunders, eds, *Economic Inequality in Australia, Volume 1: Government and Redistribution*, Proceedings of the Inequality in Australia Conference, SSEI Monograph No. 1, Centre for Applied Economic Research and the Social Policy Research Centre, University of New South Wales, Sydney, 123-50.

Saunders, P. (1993a), *Married Women's Earnings and Family Income Inequality in the Eighties*, SPRC Discussion Paper No. 40, Social Policy Research Centre, University of New South Wales, Sydney.

Saunders, P. (1993b), *Economic Adjustment and Distributional Change: Income Inequality in Australia in the Eighties*, SPRC Discussion Paper No. 47, Social Policy Research Centre, University of New South Wales, Sydney.

Saunders, P. and G. Hobbes (1988), *Income Inequality in Australia in an International Comparative Perspective*, SWRC Discussion Paper No. 4, Social Welfare Research Centre, University of New South Wales, Sydney.

Saunders, P. and G. Matheson (1991), *An Ever-Rising Tide? Poverty in Australia in the Eighties*, SPRC Discussion Paper No. 30, Social Policy Research Centre, University of New South Wales, Sydney.

Saunders, P. and G. Matheson (1992), *Perceptions of Poverty, Income Adequacy and Living Standards in Australia*, SPRC Reports and Proceedings No. 99, Social Policy Research Centre, University of New South Wales, Sydney.

Saunders, P., T. Smeeding, J. Coder, S. Jenkins, J. Fritzell, A. Hagendars, R. Hauser and M. Wolfson (1992), *Noncash Income, Living Standards, Inequality and Poverty: Evidence from the Luxembourg Income Study*, SPRC Discussion Paper No. 35, Social Policy Research Centre, University of New South Wales, Sydney.

Simons, H. (1938), *Personal Income Taxation*, University of Chicago Press, Chicago.

Smith, R. and M. Wearing (1987), 'Do Australians want the welfare state?', *Politics*, 22, 55-65.

Smolensky, E., L. Steifel, M. Schmundt and R. Plotnick (1977), 'Adding in-kind transfers to the personal income and outlay account: implications for the size distribution of income', in F.T. Juster, ed., *The Distribution of Economic Well-Being*, Ballinger Publishing, Cambridge, Mass., 9-44.

Svallfors, S. (1993), *Labourism Versus Social Democracy? Attitudes to Inequality in Australia and Sweden*, SPRC Reports and Proceedings No. 107, Social Policy Research Centre, University of New South Wales, Sydney.

Tawney, R.H. (1913), 'Poverty as an industrial problem', reproduced in *Memoranda on the Problems of Poverty*, Vol. 2, William Morris Press, London, 42-65.

Taylor, R., S. Quine, D. Lyle and A. Bilton (1992), 'Socioeconomic correlates of mortality and hospital morbidity differentials by Local Government Area in Sydney 1985-1988', *Australian Journal of Public Health*, 16(3), 305-14.

Travers, P. and S. Richardson (1993), *Living Decently: Material Well-being in Australia*, Oxford University Press, Melbourne.

Warren, N. (1989), 'Changes in Australian tax incidence between 1975-76 and 1984-85', in J.G. Head, ed., *Australian Tax Reform in Retrospect and Prospect*, Australian Tax Research Foundation, Sydney, 445-78.

Warren, N. (1991), 'Recent trends in Australian Taxation and their impact on Australian tax incidence', paper presented at a conference on Taxation Issues in the 1990s, Monash University, 25-28 June 1991.

Warren, N. (1992), 'The effect of Australian taxes and social welfare on the distribution of income in 1975-76, 1984-85 and 1988-89', in P. Raskall and P. Saunders, eds, *1992 Economic Inequality in Australia: Volume 1: Government and Redistribution,* Proceedings of the Inequality in Australia Conference, SSEI Monograph No. 1, Centre for Applied Economic Research and the Social Policy Research Centre, University of New South Wales, Sydney, 41-74.

Weatherburn, D. (1992), 'Economic adversity and crime', *Trends and Issues in Crime and Criminal Justice,* 40, August, 1-8.

White, J. and H. Posselt (1992), 'Government redistribution of income', *Australian Economic Indicators,* ABS Catalogue No. 1350.0, May, ABS, Canberra, xi-xviii.

Whiteford, P. and J. Doyle (1991), *Take-Up of Family Income Supplement in 1986 - A Research Note,* SPRC Discussion Paper No. 29, Social Policy Research Centre, University of New South Wales, Sydney.

Wilkinson, R.G. (1992), 'Income distribution and life expectancy', *British Medical Journal,* 304, 18 January, 165-8.

Yates, J. (1992), 'Imputed income and income distribution', in P. Raskall and P. Saunders, eds, *Economic Inequality in Australia, Volume 2: Some Factors Causing Inequality,* Proceedings of the Inequality in Australia Conference, SSEI Monograph No. 2, Centre for Applied Economic Research and Social Policy Research Centre, University of New South Wales, Sydney, 111-31.