

# Unemployment, Participation and Family Incomes in the 1980s

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UNEMPLOYMENT, PARTICIPATION  
AND FAMILY INCOMES IN THE 1980s

Bruce Bradbury

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Russell Ross  
Editor

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**UNEMPLOYMENT, PARTICIPATION AND FAMILY INCOMES IN THE  
1980S<sup>†</sup>**

*Bruce Bradbury*

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## ABSTRACT

What has been the impact on family incomes of the changes in participation and unemployment rates experienced during the 1980s? This paper seeks to describe the overall and distributional impact of such changes using microsimulation methods.

It is estimated that for every one percentage point increase in unemployment the average incomes of working age families will decrease by 0.75-0.85 per cent. Similarly, for every one percentage point increase in the participation rate of married women aggregate incomes increase by 0.27 per cent, and the average incomes of married couples by 0.42 per cent. Since 1983-84, falling unemployment has had a slightly greater impact on family incomes than has increasing married women's participation, although for couples the increase in women's participation has been more important.

Within family types, the impact of the increase in unemployment associated with the 1982-83 recession was unambiguously inequality increasing. This has been partly reversed subsequently, but the increased incomes due to participation increases have largely by-passed those married couples at the bottom end of the income distribution.

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## 1. INTRODUCTION

It has long been recognised that changing employment levels are one of the major channels through which macro-economic conditions influence the level and distribution of household incomes. Whilst significant research has been undertaken in other countries on the nature and magnitude of this association (see, for example, Blinder and Esaki, 1978; Nolan, 1986), little has been conducted in Australia. It is generally taken for granted that if macro-economic policy leads to reduced employment this will in turn lead to lower household incomes and increased inequality.

The present Federal Government, for example, has argued that the wage restraint flowing from its Accord with the ACTU has significantly increased employment, and that this employment growth has been 'a major achievement in advancing social justice and removing people and families from poverty' (Hawke and Howe, 1989). This link between wage levels and employment growth is not examined in this paper. Rather the paper addresses the second leg of this argument—that increases in employment will advance social justice by leading to increased average incomes and reduced income inequality. In particular, the paper estimates the overall magnitude and distribution of income changes associated with changing unemployment and labour force participation patterns over the 1980s.

The last decade has indeed seen significant changes in aggregate employment patterns. From a level of 5.6 per cent in August 1981, the unemployment rate rose rapidly to 9.9 per cent in August 1983, followed by a slow decline to 5.7 per cent in August 1989. Whilst overall participation rates also fell slightly during the 1982–83 recession, their growth since that time has been very strong, particularly for married women. In August 1983, 42 per cent of married women were in the labour force. By 1989 this had risen to 51 per cent. In association with this growth in married women's participation, a shift towards part-time employment has also occurred. In August 1980, 16 per cent of the employed were working part-time. By 1989 this had risen to 21 per cent.<sup>1</sup>

In broad terms, the impact of such changes on family incomes is clear enough—incomes are usually higher for employed than for not-employed people, and so average family incomes will be positively correlated with employment rates. In Australia the flat-rate unemployment benefit system should mean that this difference will be particularly significant (Saunders, Bradbury and Whiteford, 1989). Similarly

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1. All figures are from the ABS Labour Force Survey, via dX Time Series Data service.

it would be surprising if inequality of incomes was not positively correlated with unemployment rates.

However, there are a number of reasons why this simplified picture is far from adequate. Although employment status may be a strong determinant of an individual's income at a particular point in time, such income levels are likely to be only weakly related to economic welfare. In general, consumption, and by inference welfare, is usually assumed to stem from both a wider income sharing unit (e.g. the family or household) and incomes received over a significant period of time. For meaningful analysis of the distributional impact of employment changes, aggregation over both these dimensions is thus highly desirable.

This paper follows a convention established in much of the Australian literature by analysing the distribution of income across *income units* as defined by the Australian Bureau of Statistics (ABS). Income units comprise either married (including de facto) couples, couples with dependents, sole parents with dependents, and single adults.<sup>2</sup> Whilst the choice of this unit in this paper is largely dictated by data availability considerations, it does have the advantage of being similar to the concepts used in parts of the Australian personal income tax and in the social security systems. Throughout the paper the term 'family' will be used synonymously with this income unit concept.

The key income concept examined is that of after tax annual family income, as this is the measured income concept most closely related to welfare, and the twelve month period is the longest available in the data.<sup>3</sup> The impact of unemployment on the income distribution over such a period will in general be quite different to the impact over shorter periods—depending upon whether unemployment is concentrated on a few full-year unemployed individuals, or spread more thinly across many persons with short unemployment spells.

In the next section of the paper the different methods which can be used to estimate these relationships between labour market status and incomes are introduced, and a 'back of the envelope' introduction to the method used in the remainder of the paper presented. Section 3 then provides a more detailed description of the changes since 1981 in employment patterns for different family categories, and in the patterns of unemployment concentrations over twelve month periods.

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2. Dependents are defined as persons 'aged under 15 years, or aged 15 to 20 years and a full-time student, who has a parent/guardian in the income unit and is neither a spouse nor parent of anyone in the income unit' (ABS, 6545.0). Non-dependent children are thus defined as single adult income units even if they are still living with their parents.

3. A case can also be made that saving constraints make the use of longer or 'permanent' income measures inappropriate.

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In order to translate these employment changes into family income outcomes, it is necessary to have information on the relationship between labour market status and incomes. The *1986 Income Distribution Survey* (IDS) is used in Section 4 to describe this relationship. In Section 5 a method is proposed (and evaluated) for the integration of these data with the information on trends in labour force status. This is then used to estimate the relationship between employment changes and family incomes for the years 1981–82 to 1988–89. Finally Section 7 presents a summary of the key results.

## 2. SIMULATING THE IMPACT OF CHANGING EMPLOYMENT CONDITIONS—A ‘BACK OF THE ENVELOPE’ OVERVIEW

There are two different methods which have been used to estimate the relationships between macro-economic changes and income distribution outcomes. The first involves the estimation of the inter-temporal relationship between macro-economic variables (such as growth rates, unemployment, price changes and profitability) and measures of income inequality (see Blinder and Esaki, 1978, and the references therein). Whilst such studies provide a relatively direct measure of the impact of business cycle variables on family living standards, they require a time series of detailed and comparable data on the distribution of incomes. Such data do not exist in Australia.

The alternative method (used here) is to simulate such changes. With this method the detailed relationship between incomes and labour force status at one point in time (the *base* data) is combined with data on labour market changes over time (the *calibration* data) to simulate the income distribution that might be expected under different labour market conditions. This ‘static simulation’ approach is frequently used to either obtain synthetic data referring to years different from the original survey data, or to simulate particular policy changes.<sup>4</sup> The concern of the present paper is restricted, however, to the impact of changing employment patterns.

The simulation of labour market changes on household survey data sets can be achieved by either adjusting the *variables* in the data set or by modifying the *case structure*. For example, to simulate an increase in the aggregate level of unemployment one could select some of those persons recorded in the survey as being employed and ‘sack them’. That is, adjust their recorded incomes to reflect the income they would be expected to receive if they became unemployed. This is the

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4. For an overview of microsimulation research in the Europe, the United States and Australia respectively, see the collections by Atkinson and Sutherland (1988), Lewis and Michel (1990), and Bradbury (1990a). These collections also contain papers contrasting the static simulation method used here, with more complicated dynamic simulation methods (which are essentially developments of the ‘variable adjustment’ approach).



method used by Nolan (1986) who models the effect of a one percentage point increase in unemployment on the UK annual income distribution.

The main practical problem with this variable adjustment method is that it requires the estimation of the values that each of the income variables takes when the person is in the new labour market situation. This is particularly problematic when an increase in employment (and hence wages) needs to be modelled. As a consequence, Australian research has tended to use the case adjustment approach.

When sample surveys are conducted, a 'weight' is typically calculated to describe the number of families in the population that each family in the survey represents. These weights are derived from the inverse of the probability of selection, with some adjustment for factors such as differential non-response. An increase in unemployment can thus be modelled by increasing the weights of those cases experiencing unemployment, whilst decreasing the weights of those with no unemployment (to maintain the same total population). This adjustment essentially assumes that the characteristics of the new unemployed will be the same as those already unemployed. Income distribution calculations which take account of these new weights will then reflect the increase in unemployment.

Although the variable and case adjustment methods are on the surface quite different simulation methodologies, in principle the (weighted) univariate distribution of the variable which is adjusted (e.g. labour market status) will be the same in the new data set irrespective of which method is used. This follows from the fact that both methods make adjustments to ensure that the synthetic data corresponds with the calibration data. Indeed, bivariate distributions may also be identical in some circumstances. Thus, if the variable adjustment process gives those persons newly assumed to be unemployed, incomes with the same distribution as the incomes of those who were previously unemployed, the two methods will provide identical estimates of the relationship between unemployment and incomes.

It is only with higher order distributions which include variables that have not been explicitly adjusted that the two methods will usually give different results. The variable adjustment method assumes that the overall distribution of such incidental variables is the same in the two time periods, whilst the case adjustment approach assumes that the conditional distribution of the incidental variable within each adjustment category is independent of time.

It is not obvious which of these simplifying assumptions is most appropriate for modelling changes in the labour force distribution. For some variables, we would expect the change in status to have such a large impact that the other variables would also vary and so the new unemployed, for example, would be more like the old unemployed than the employed. (The association of wives income with husbands'

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labour force status is a possible example.) A contrary example is given by single person households—who are often aged and hence non-participants in the labour force. A decrease in participation rates for all single person households should thus be reflected in a change in the age distribution of single non-participants, as most new non-participants will be non-aged.<sup>5</sup>

In practice, data limitations mean that for modelling decreases in unemployment, the case adjustment method is the most feasible method, and so this has been used here. Whilst the mechanics of such simulations can become rather complicated, the essence of the approach can be quite simply summarised in the type of 'back of the envelope' calculation shown in Table 1.

The left hand section of the first panel of this table shows the mean gross personal incomes in each of four different labour market states for the period September to December 1986, for income unit heads and spouses (the base data). The right hand panel shows changes in the distribution of the population across these different labour force states for selected years between 1981–82 and 1988–89. For comparison, the labour force distribution in the *1986 Income Distribution Survey* (IDS) is also shown.

The first thing to note is the lack of direct compatibility between the base and calibration data. The former only refers to income unit heads and spouses (including single person income units), whilst the latter describes the labour market status of all persons aged 15 and over. The presence of dependent children aged over 14 and not in the labour force thus explain the higher proportion of the calibration data not in the labour force. Setting this discrepancy to one side, these two sets of data can be used to make an approximate estimate of the impact of the labour force status changes on average incomes.

This follows from the fact that the overall average income is simply the weighted average of the incomes of each labour force group, where the weights are the proportions of the population in each group. If the mean income of each labour force group is assumed to be constant (the conditional independence assumption), then changes in the overall mean income will simply reflect the changes in the weights—i.e. the change in the labour force distribution. These weighted average incomes are calculated from the data in the table for each of the years, as well as for the base data. The index of relative incomes is the most interesting result, indicating that unemployment and participation changes led to gross incomes falling by around

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5. The ultimate solution to such problems is the use of more and more detailed calibration data. This however requires additional computational complexity and implies a reduced level of transparency of the results to the data inputs.

TABLE 1: SIMPLE ESTIMATES OF THE IMPACT OF CHANGES IN THE LABOUR MARKET ON AVERAGE CURRENT INCOMES OF PERSONS

Labour Force Status	Base Data (Sept-Dec 1986) <sup>♦</sup>		Calibration Data (various years) <sup>♦</sup>			
	Mean Gross Labour Force Income (\$p.w.)	Distribution %	Labour Force Status Distribution			
			1981-82 %	1983-84 %	1985-86 %	1988-89 %
<i>Effect of Overall Labour Force Status Changes</i>						
Not in Labour Force	\$100.3	34.2	39.0	39.5	38.6	37.4
Unemployed	\$83.6	5.2	3.8	5.8	4.9	4.1
Part-time	\$209.7	11.2	9.2	9.5	10.4	11.7
Full-time	\$421.6	49.4	48.0	45.2	46.1	46.8
TOTAL	\$270.1	100.0	100.0	100.0	100.0	100.0
Weighted Average Income <sup>†</sup>		\$270.4	\$264.0	\$255.0	\$259.4	\$262.4
Index 1983-84=100			103.5	100.0	101.7	102.9
<i>Effect of Participation Changes</i>						
Not in Labour Force	\$100.3	34.2	39.0	39.5	38.6	37.4
In Labour Force	\$358.8	65.8	61.0	60.5	61.4	62.6
TOTAL	\$270.1	100.0	100.0	100.0	100.0	100.0
Weighted Average Income		\$270.4	\$258.0	\$256.7	\$259.0	\$262.1
Index 1983-84=100			100.5	100.0	100.9	102.1
<i>Effect of Unemployment Changes</i>						
Not in Labour Force	\$100.3	34.2	(38.6)	(38.6)	38.6	(38.6)
Unemployed	\$83.6	5.2	3.8	5.9	4.9	4.0
Employed	\$382.4	60.6	57.6	55.5	56.5	57.4
TOTAL	\$270.1	100.0	100.0	100.0	100.0	100.0
Weighted Average Income		\$270.4	\$262.2	\$255.9	\$258.9	\$261.6
Index 1983-84=100			102.5	100.0	101.2	102.2
<i>Effect of Full-time/Part-time Employment Changes</i>						
Not Employed	\$98.3	39.4	(43.5)	(43.5)	43.5	(43.5)
Employed Part-time	\$209.7	11.2	9.1	9.8	10.4	11.3
Employed Full-time	\$421.6	49.4	47.4	46.7	46.1	45.2
TOTAL	\$270.1	100.0	100.0	100.0	100.0	100.0
Weighted Average Income		\$270.4	\$261.7	\$260.2	\$258.9	\$257.0
Index 1983-84=100			100.6	100.0	99.5	98.8

Notes: ♦ ABS, 1986 Income Distribution Survey, Unit Record File. Calculated for heads and spouses of income units in the ABS current income population (see ABS Cat. No. 6545.0).

♦ ABS, Labour Force Survey, monthly averages (via dX Data). Proportions of civilian population aged 15 and over.

† The weighted average of the incomes in column 1, using the labour force status distributions as weights. The difference between \$207.1 and \$270.4 reflects rounding error.

3.5 per cent between 1981–82 and 1983–84, and recovering by 2.9 per cent up to 1988–89 (these percentages are derived from the index numbers in the table, and thus reflect percentage changes with the 1983–84 levels in the denominator).

These data can also be used to calculate a simple decomposition of these changes into those due to participation, unemployment, and part-time/full-time employment changes. The second panel of Table 1, headed 'Effect of Participation Changes', thus simplifies the presentation to consider only the incomes and proportions of those people in and out of the work force. (All the numbers in the second and following panels are derived from those in the first panel.) The impact of participation rate increases on their own has clearly been important, implying a 2.1 per cent increase in average incomes since 1983–84. (Remember however that this assumes that the new participants have the same average incomes as the old.)

To calculate the separate impact of unemployment, it is necessary to fix the participation rate at some arbitrary level (the 1985–86 average is used here) and adjust the proportions of the population unemployed and employed so that the unemployment rates in the first panel of the table are replicated.<sup>6</sup> Between 1981–82 and 1983–84 increasing unemployment led to incomes dropping by 2.5 per cent, recovering only 2.2 per cent in the ensuing five years. Similarly, the effect of changes in the relative proportions of part-time and full-time employment can be separately shown. Since 1983–84, the increasing proportion of part-time workers has offset the increases due to participation and unemployment changes by 1.2 per cent.

Such calculations thus provide a simple illustration of the likely impact of employment changes on incomes. Moreover, whilst the sum of these three separate changes is only a first order approximation of the impact of the overall change (e.g.  $1.021 \times 1.022 \times .988 = 1.031 > 1.029$ ) this does give some idea of the relative importance of the changes in the different labour market components. Thus, since 1983–84 the increase in participation has contributed nearly as much to increases in incomes as has the decrease in unemployment. This conclusion needs to be tempered by the fact that the increase in participation has been primarily in part-time employment and the combined effect of participation and part-time employment changes is less than that due to unemployment.

Of course there are major limitations with such a simple approach. Whilst useful for the examination of aggregate trends, the incomes of persons at one point in time are likely to be only weakly related to welfare levels, and so of limited relevance to an examination of the distributional impact of labour market changes. To address these issues requires the consideration of a wider income sharing unit, as well as some

6. For example, the 1981–82 estimate of 57.6 per cent employed is obtained as the solution of the following equation:  $x/(100-38.6) = (48.0+9.2)/(100-39.0)$ .

degree of aggregation over time (and also an allowance for income tax). In the next three sections of this paper, data and methods that can be used to simulate this broader aggregation are introduced. Whilst the calculations behind the results to be presented are significantly more complicated than those shown in Table 1, the underlying concepts are the same. Both methods involve the use of similar counterfactual assumptions, with the process of weight adjustment in the second method simply a more sophisticated method for taking weighted averages—permitting a larger number of categories and dependent variables.

In Table 1, the conditional independence assumption appears via the assumption that the *average* incomes of each labour force category remain constant. To obtain the estimates of distributional changes presented in Section 6, this assumption must be made stronger—so that the *distribution* of income within each category is assumed constant. On the other hand, the categories of labour market status are separately calculated for different family types, essentially permitting a weakening of the independence assumption.<sup>7</sup> Similarly, later calculations move away from the focus on individual incomes in Table 1, and instead consider the implications of changing patterns of joint husband and wife employment patterns. These changing employment patterns are of interest in themselves, and so it is appropriate to view them in more detail first.

### 3. THE CALIBRATION DATA: FAMILY EMPLOYMENT TRENDS, 1981 TO 1989

#### Employment Trends by Family Status

Because labour market status is typically considered a feature of individuals, most Australian labour market data are of only limited use for the estimation of the impact of labour market changes on family incomes. Even when, as in this paper, a very narrow definition of the family is used, information on the joint distribution of husbands' and wives' labour market status is required. This is particularly important for the 1980s, where there were major changes in the employment patterns of both women and men.

The only source of such information over the time period considered here is from the ABS surveys of the *Labour Force Status and Other Characteristics of Families (LFSOCF)*, conducted in June or July of each year. This provides information on the labour market status of persons in different family categories, as well as providing a

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7. For example, differential changes of unemployment rates between single person households and married couples might be expected to lead to changes of the average incomes in different labour market states.

TABLE 2: THE DISTRIBUTION OF INCOME UNIT TYPES IN 1986

<i>Income Unit Type</i>	<i>Percentage Distribution</i>		<i>Mean Net Income 1985-86 (\$000)</i>
	<i>June 1986</i>	<i>September- December 1986</i>	
Married Couple Income Units			
without dependents	23.0	23.7	18.7
with dependents	26.1	25.9	23.4
Single Adult Income Units Living with Other Family Members			
Sole Parents	4.4	4.2	8.6
Other Family Heads	3.4	2.8	9.3
Adult Children of Family Head	17.5	16.8	8.5
Other Relatives of Family Head	2.9	2.5	8.1
Single Adult Income Units Not Living with Family Members			
Single Person Households	14.0	16.2	10.9
Group Households	8.7	7.9	10.1
TOTAL	100.0	100.0	16.3
Number ('000)	7,175.9	7,633.8	
Sources: ABS, <i>Labour Force Status and Other Characteristics of Families, Australia</i> , June 1986 (Cat. No. 6224.0), adjusted as per Footnote 8 and ABS, <i>1986 Income Distribution Survey, Unit Record File</i> .			

cross-classification of the labour market status of husbands and wives. Table 2 shows the distribution of income units across different family classifications available from the survey in June 1986 as well as from the *1986 Income Distribution Survey* (IDS) undertaken in September-December 1986 (the base data). For latter reference, the table also includes information on the mean after tax incomes of each family type in 1985-86.<sup>8</sup>

The most common income unit types are married couples, adult children and single person households. Together, these income unit types comprised 80.6 per cent of income units in June 1986. Persons in households of unrelated adults comprised another 8.7 per cent, followed by sole parents (4.4 per cent), other family heads (e.g. sole parents with only non-dependent children, one of a pair of siblings living together) (3.4 per cent) and other relatives (e.g. parents of the family head) (2.9 per cent).

These patterns are broadly replicated in the 1986 IDS, with the differences stemming from the different collection methodologies employed. The most important difference is the narrower coverage of the LFSOCF survey, which covered only 93 per cent of the population (see Footnote 8), compared to around 98 per cent for the 1986 IDS. This is why the IDS reports half a million more income units than does the LFSOCF survey. The larger proportion of single person households in the IDS results from the inclusion of persons in non-private dwellings in this survey—most of whom would be classed as single person income units.

Over the period 1981 to 1989, the demographic composition shown in Table 2 has changed somewhat, with increases in the proportion of income units comprising single adults and decreases in the proportion of married couples with

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8. The LFSOCF survey suffers from a number of breaks in consistency. The most important occurred between the 1982 and 1983 surveys, where the scope of the survey was narrowed to exclude persons enumerated in non-private dwellings, or enumerated as visitors to private dwellings, or in private dwellings where it was not possible to collect information on all usual residents. The 1983 and subsequent surveys thus have a coverage of only around 93 per cent of the civilian population aged 15 and over.

Other changes include: The definition of dependent was changed in 1986 to include full-time students aged 21-24. The category 'other families with dependents' was re-defined as 'sole parents' in 1989 (98 per cent of 'other families with dependents' were defined as sole parents). In Table 2 the June 1986 proportions have been adjusted to conform to the definition of dependent used in the IDS survey. This involved 0.5 per cent of couples with dependents in the June 1986 survey being classified as couples without dependents. This adjustment was made on the basis of calculations from the 1986 IDS using both definitions of dependent. Also 4.5 per cent of persons classed as full-time students aged 15-24 were assumed to be aged 21-24 and hence classed as adult children of the family head rather than as dependents.

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dependents. These changes are *not* taken into account in the simulations reported here, which focus upon labour market changes within each income unit type.<sup>9</sup>

Since labour market data are rarely presented in terms of family rather than personal characteristics, Figures 1 to 5 present some of the key results available from the LFSOCF surveys.

#### *Participation Rates*

Figure 1 shows the participation rates over the period for persons in different family types. The highest participation rate is for husbands with dependents, whose participation rate dropped only slightly over the period from 96 to 94 per cent. Adult children and persons in group households also had high participation rates, with the latter rising from 79 to 85 per cent between 1981 and 1984.

Husbands without dependents had significantly lower participation rates than those with dependents, reflecting the higher proportion over retirement age. In fact, the slight fall in the participation rate for husbands without dependents over the period (from 63 to 61 per cent) can be explained by their changing age distribution. In 1981, 27.7 per cent of husbands without dependents were aged over 65, whilst by 1989 this had increased to 29.5 per cent. The vast majority (around 90 per cent) of those aged over 65 are not in the labour force, and so this change in the age distribution alone could account for most of the two percentage point drop in the total participation rate for husbands without dependents.

The most dramatic changes in participation rates over the period have been for married women and sole parents. For the latter group, participation rates fell between 1981 and 1983 (possibly reflecting hidden unemployment), but steadily increased thereafter, rising to 56 per cent in 1989.

Wives with dependents steadily increased their participation from 46 per cent in 1983 to 59 per cent in 1989. As for husbands, the participation rate for married women without dependents is overall lower than that for those with dependents because of their very different age distribution. To control for this, Figure 1 also shows the participation rates for married women without dependents who had husbands in the labour force. This largely excludes the older married women. For this group, the participation rates are higher than for wives with dependents, and have increased significantly from 57 per cent in 1981 to 67 per cent in 1989.

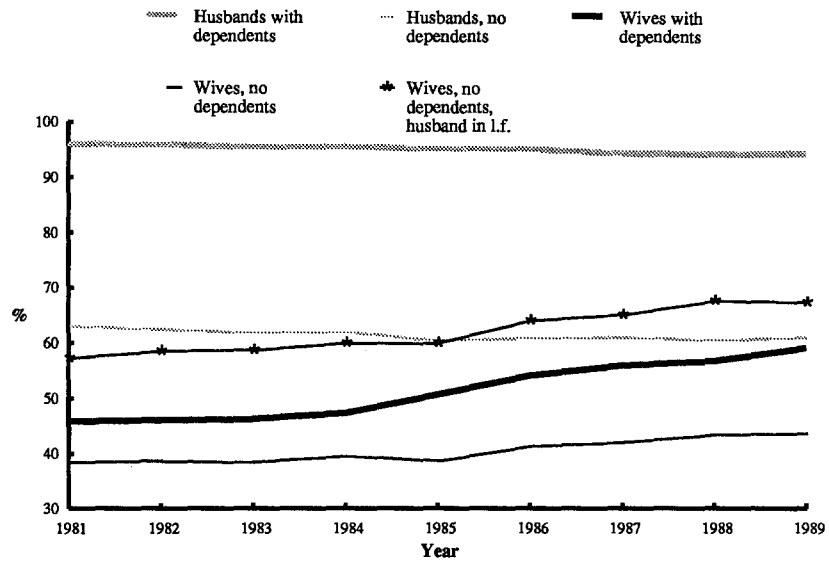
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9. It is not difficult to incorporate demographic changes into the method used, but to do so would unduly complicate the presentation of results as the demographic changes have led to a fall in average income unit incomes simply because the number of income units has increased faster than the number of adults.



Figure 1: Participation Rates, 1981 to 1989

## a) Married Couple Income Units



## b) Single Adult Income Units

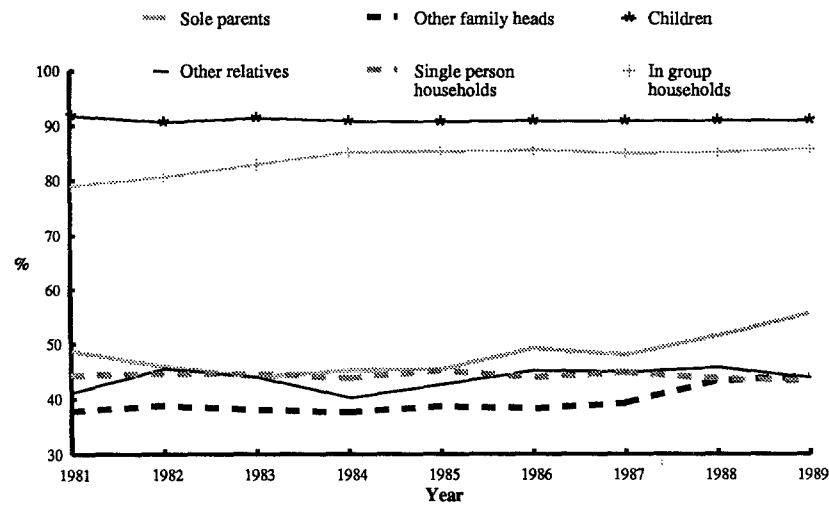
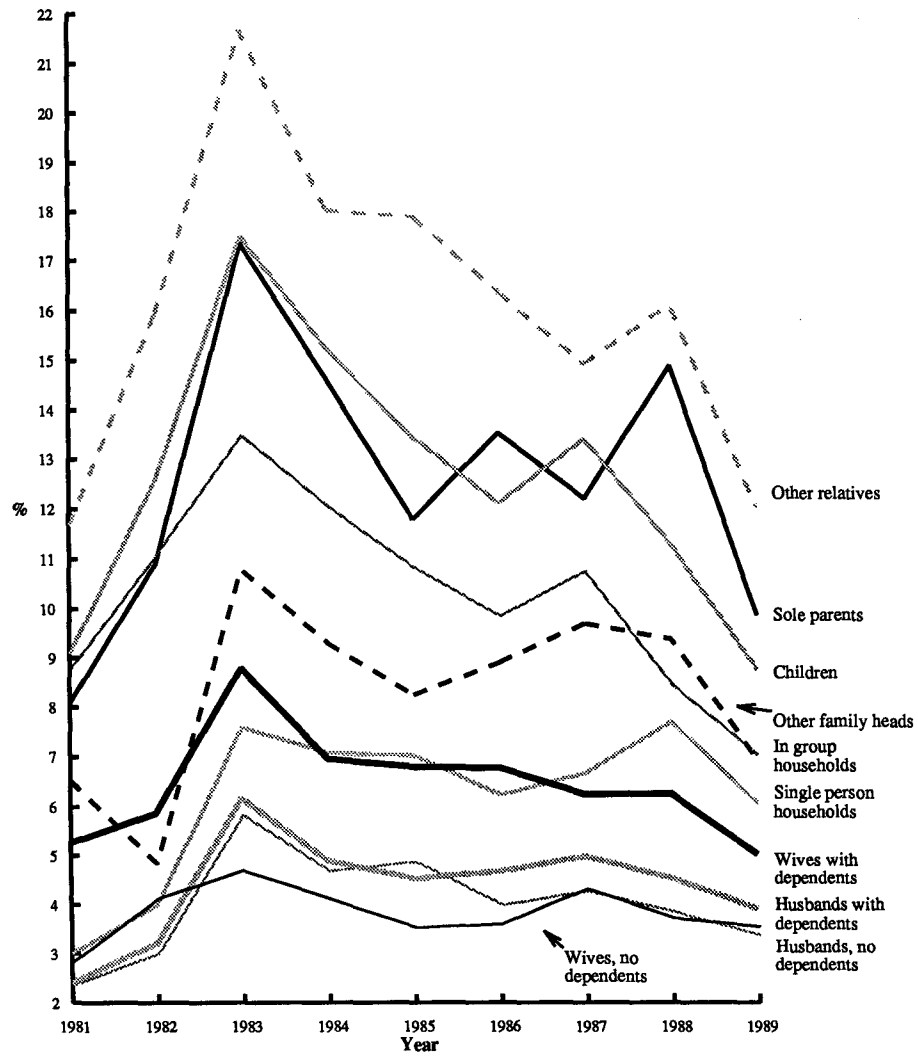
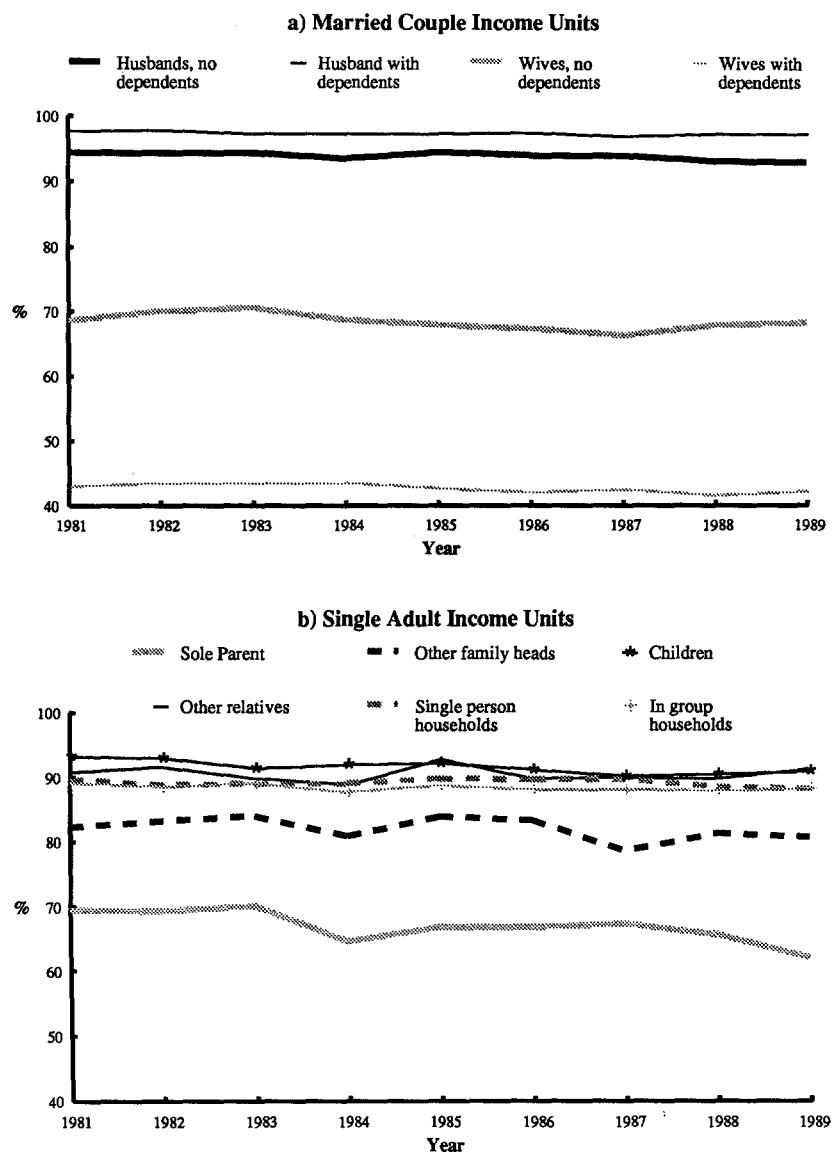


Figure 2: Unemployment Rates, 1981 to 1989

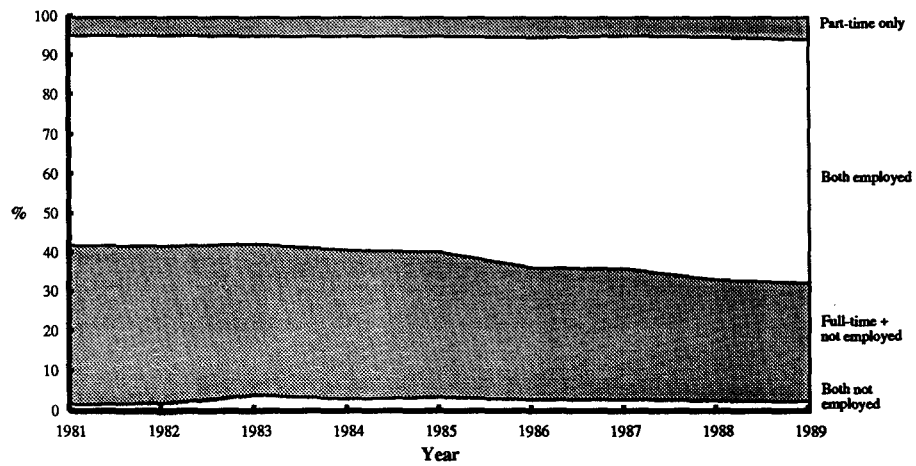


**Figure 3: Full-time Employment Rates, 1981 to 1989**  
(Full-time as a Proportion of all Employed)



**Figure 4: Combined Labour Market Status of Couples, with at Least One Member in the Labour Force, 1981 to 1989**

**a) Couples Without Dependents**



**b) Couples With Dependents**

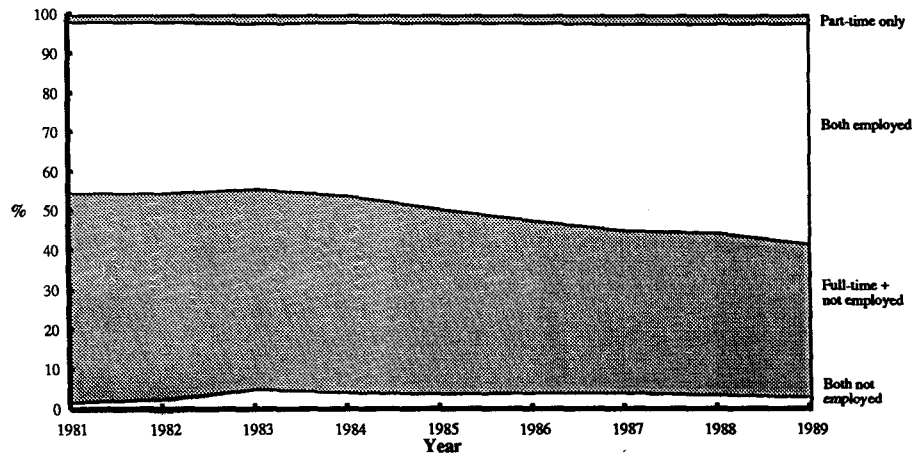
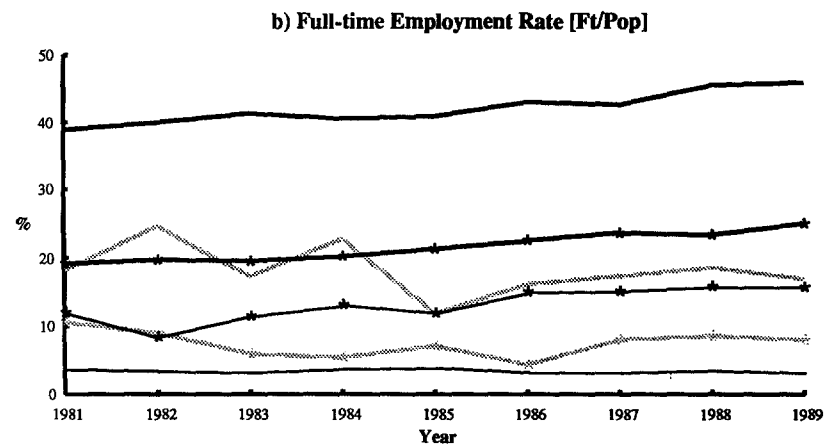
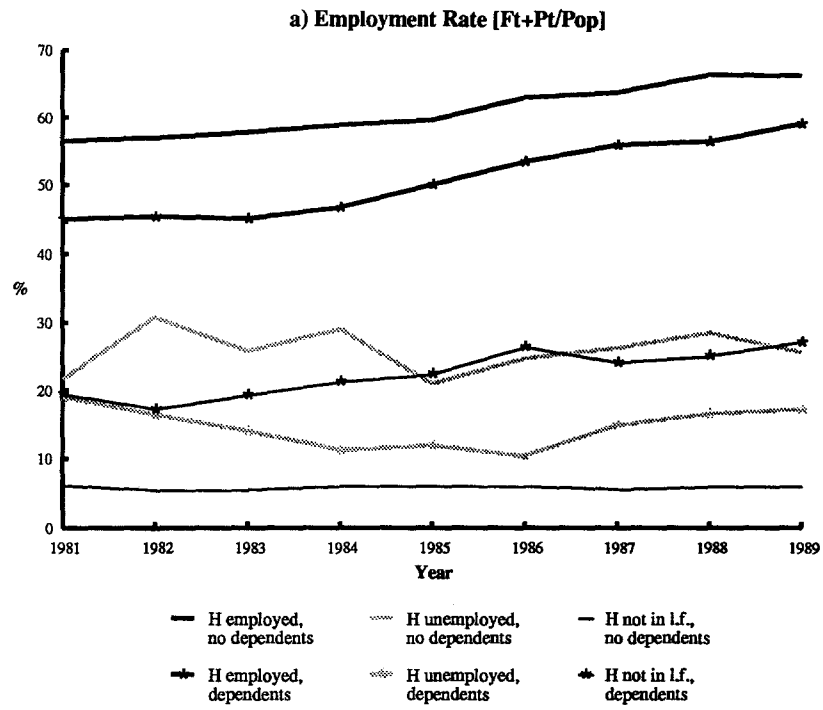


Figure 5: Employment Rates of Married Women by Husband's Employment Status



Participation rates for the other population groups all lie below 50 per cent for the whole of the period. These low rates mainly reflect the proportion of the group over retirement age.<sup>10</sup> The increase in the participation rate for 'other family heads' mirrors that for sole parents, and may reflect the fact that this category contains many sole parents with non-dependent children.

#### *Unemployment Rates*

Figure 2 shows unemployment rates for persons in the different family categories. All groups show the same general trend of a rise in unemployment during 1982 and 1983 followed by a slow fall to 1989. Absolute unemployment rates, however, vary considerably, with other relatives, sole parents, and children of family heads all having rates above 17 per cent in 1983, whilst husbands, wives and persons living alone had rates below 10 per cent.

Whilst the unemployment rates for husbands with and without dependents are very similar up until 1985, after this date the two rates diverge, with a much slower fall in unemployment rates for those with dependents than those without. One possibility is that this reflects more of those without dependents withdrawing from the work force (they are generally older). However, as was noted above, the participation rate for husbands (aged under 65) without dependents appears to have remained essentially constant over the period.

#### *Full-time Employment Rates*

Figure 3 presents information on the proportion of the employed who were in full-time employment. Most groups show a steady decline in full-time employment rates over the period, with the decline most dramatic for sole parents, of whom around 70 per cent were in full-time employment at the beginning of the decade, compared to 62 per cent in 1989. This increase in part-time work for sole parents has largely offset their increase in labour market participation shown in Figure 1. As a consequence, the proportion of all sole parents who were in a full-time job decreased from 31 to 25 per cent between 1981 and 1983, only returning to 31 per cent in 1989.

#### *Combined Labour Market Status of Married Couples*

In Figure 4 some elements of the combined labour market status of husbands and wives are shown. To obtain results more relevant to the working age population,

10. In 1989 the proportions aged 65 and over were 35.2, 40.4, 42.8 and 3.9 per cent for 'other family heads', 'other relatives', single persons and persons in group households respectively. These represented increases of -3.8, -2.3, 1 and -1.9 per cent over 1983 figures. Because of the change in coverage between 1982 and 1983 (see Footnote 8), in Figure 1 (and in the following analysis) it is assumed that the 1982 participation rate for single persons was equal to the rate in 1983.

couples with both members out of the labour force are not included, and to simplify the presentation, the possible 15 categories are reduced to four:

- *Both not employed*, neither husband or wife employed,
- *Full-time+not employed*, one employed full-time and the other not employed,
- *Both employed*, both employed,
- *Part-time only*, one employed part-time and the other not employed.

The sizes of the *both not employed* categories primarily reflect the changing unemployment rates over the period. The proportion of couples without dependents (with at least one member in the labour force) in this category rose from 1.9 per cent in 1981 to 4.3 per cent in 1983, falling back to 2.7 per cent by 1989. The corresponding estimates for those with dependents are 2.0, 5.4 and 3.3 per cent.

The 'traditional' family arrangement of husband employed full-time and wife not employed represents the bulk of cases in the *Full-time+not employed* category, whereas two income families are represented in the *both employed* category. The trend towards the latter pattern of employment is clearly evident in both charts. Whilst the single earner family comprised over half (53 per cent) of all couples with dependents in 1981 (compared to only 43 per cent with both employed), by 1989 this picture had reversed, with 56 per cent having two earners, and only 39 per cent having one full-time worker. The increase for couples without dependents was almost as dramatic, with the proportion of families with both husband and wife employed rising from 53 to 62 per cent.

This increase in married women's participation, however, has not been evenly spread. In Figure 5, wives' employment rates are shown separately according to the presence of dependents and husband's employment status. Only in those families where the husband was employed was the employment rate of wives above 40 per cent, and it is only wives without dependents and with employed husbands who have high full-time employment rates. This is a pattern that has been noted in previous research by Scherer (1978) and Cass and Garde (1983).

Whilst the low employment level of wives without dependents and with husbands not in the labour force may be explained by their different age distribution, other explanations are needed for the patterns for the other family types. There are at least three (non exclusive) explanations that can be advanced for the observed association between husband's and wife's employment status. The first is that it is a reflection of associative mating, with persons with high employment probabilities tending to marry each other. Second, it may reflect the 'male breadwinner' role in the family, with women reluctant to search for employment when their husband is not working.

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Finally, this pattern may be a result of the very high effective marginal tax rates implied by government income transfer programs.<sup>11</sup>

Particularly if this latter explanation is the case, it is of concern that the divergence in wives' employment rates in different family types has grown over the decade. Employment rates for those married women with employed husbands have grown strongly, whilst for those with unemployed husbands employment has either fallen or remained stable. (Some increase has been observed for wives with dependents and with husbands not in the labour force.) The increase in labour force participation of wives, it appears, has largely failed to assist those families hit hardest by the relatively high levels of unemployment experienced during the 1980s.

### Duration patterns

The trends just described refer only to the distribution of persons and families across different employment states at the time of the surveys conducted. Whilst there is no time-series data set that describes family labour market states for a twelve month period, the ABS *Labour Force Experience* (LFE) (Cat. No. 6206.0) surveys can be used to gain some general insights into the relationship between aggregate unemployment and the patterns of unemployment experience over calendar years.<sup>12</sup>

The aggregate distribution of unemployment experience over a particular twelve month period will, in general, be a complicated function of unemployment inflow and outflow rates before and during the year. For example, the distributional impact of a transitory increase in unemployment inflow (such as occurred during the 1982–83 recession) depends upon the precise timing of the inflow with respect to the period. Thus, an inflow peak towards the end of the year will lead to an increase in the proportion of short term experience during the year in question, whilst the same inflow at the beginning of the year could lead to an increase in the proportion with durations over six months.

It is thus a non-trivial exercise to go from data on inflows and outflows to estimates of the distribution of unemployment spells during a period. However there do seem to be some empirical regularities that can be used to assist the estimation of the impact of changing labour market conditions on incomes. Nolan (1986) summarises research from both the US and the UK which indicates that, in general, when the overall unemployment rate is relatively high,

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11. An additional hypothesis is that these patterns reflect regional unemployment rates. However most of the variation is in participation rates, and so this explanation is likely to be only of minor importance.

12. For most years the LFE survey refers to the twelve months during the year ending in February. Here, the data from the surveys is described in terms of the calendar year which it most represents.



- the number experiencing some unemployment during a 12 month period is relatively high; and
- those experiencing unemployment during the year are relatively more concentrated in the higher duration categories.

Figure 6 shows that for persons generally, and also for males, this first conclusion also holds for Australia. In 1980, for example, when the average unemployment rate was 6 per cent, 16 per cent of those in the labour force at some time during the year experienced some period looking for work (whilst not employed).<sup>13</sup> By 1983, unemployment had risen to 10 per cent, with 20 per cent of the labour force experiencing some job search. The fall in unemployment rates over subsequent years was also generally matched by a fall in the proportion of the labour force looking for work.

Whilst a similar pattern also holds for males, the pattern for females after 1983 is more erratic, with both measures falling to 1985, but with unemployment experience oscillating significantly in the years thereafter. This possibly reflects the greater mobility of women between the measured states of unemployment and not in the labour force.

Figure 7 shows that Nolan's second conclusion is also valid for Australia. The figure shows the proportion of those who looked for work at some time during the year, who were either looking for work for 26 weeks or more, or were looking for work for the full year. Both these indexes (particularly the half year measure) show a strong positive association with the average unemployment rate. In 1980, for example, 29 per cent looked for work at least half year, and 12 per cent full year. By 1983, this had risen to 40 per cent and 18 per cent respectively.<sup>14</sup> This same general pattern is also replicated for males and females separately (not shown), though the relationship is again more variable for (particularly married) females.

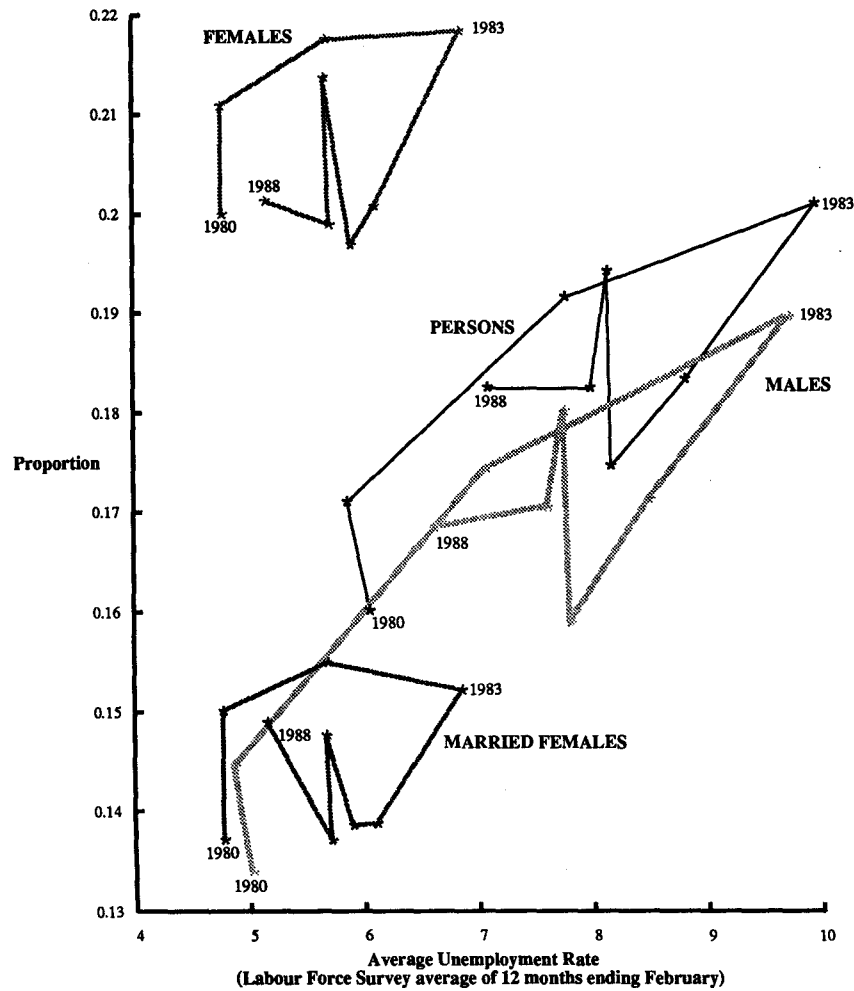
The fact that unemployment experience generally increases and that unemployment experience becomes more concentrated as the overall unemployment rate rises, prompts the question of whether the increase in unemployment experience can be explained simply by the increase in long duration unemployment. Or to put this the other way round—does the proportion of the labour force experiencing short

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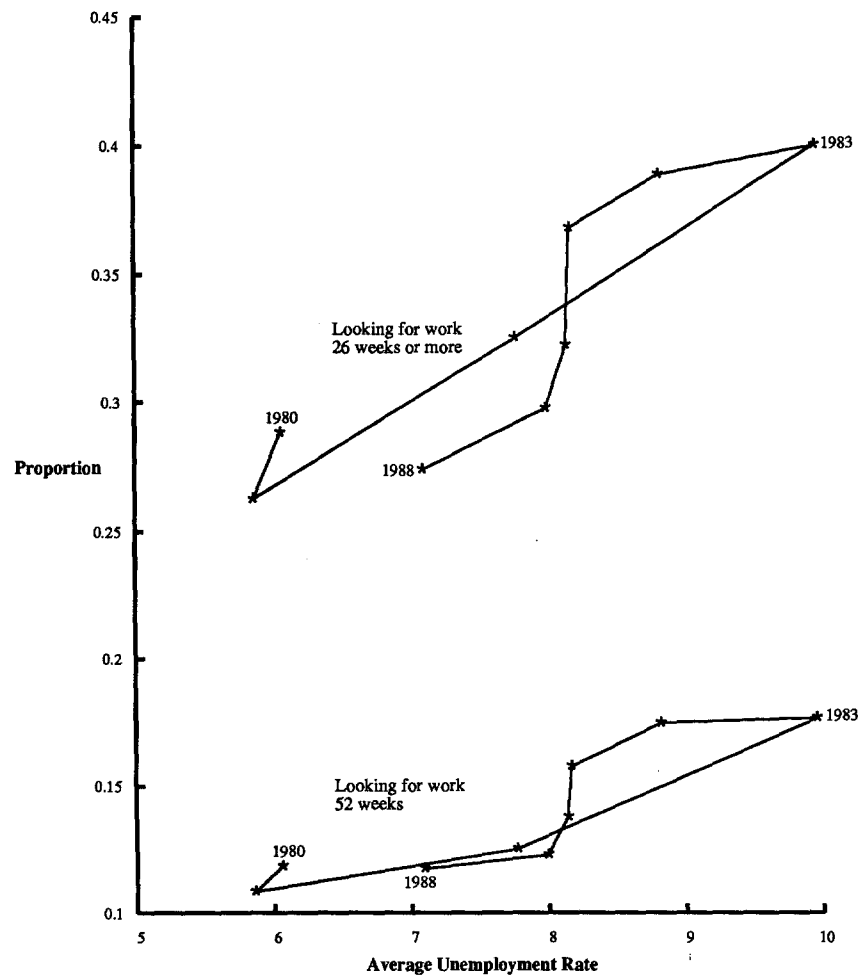
13. It should be noted that the definitions of unemployment are not the same in the two surveys. The definition of unemployment in the labour force survey defines unemployment in terms of availability for work and active job search. The labour force experience survey simply asks persons how many weeks during the year they were looking for work (whilst not working).

14. All these indices are dramatically higher if calculated in terms of unemployment-weeks rather than in persons. For example, in 1983, 76 per cent of unemployment-weeks were experienced by people looking for work more than half the year and 42 per cent were experienced by the full-year unemployed.

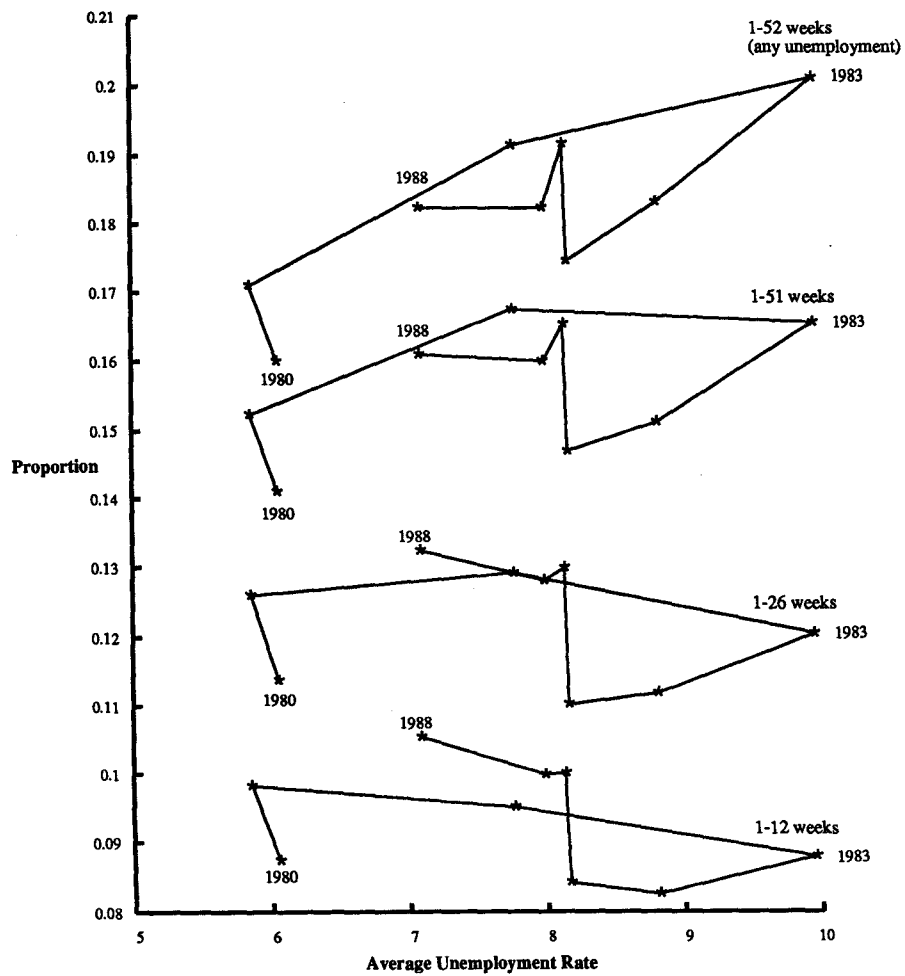
**Figure 6: Proportion of Those in the Labour Force at Some Time During the Year Who Looked for Work, by Average Unemployment Rate, 1980 to 1988**



**Figure 7: Proportion of Those Looking for Work at Some Time During the Year with Long Durations of Job Search, by Average Unemployment Rate, 1980 to 1988**



**Figure 8: Proportion of Those in the Labour Force at Some Time During the Year with Different Search Durations, by Average Unemployment Rate, 1980 to 1988**



durations of unemployment remain relatively constant as the overall unemployment rate changes?

This question is addressed in Figure 8, which shows the proportion of those in the labour force at some time during the year who spent different lengths of time not employed and looking for work. The line at the top of the figure describes the proportion of the labour force who spent any weeks during the year looking for work. It is identical to the 'Persons' line in Figure 6. The second line in Figure 8 shows the proportion of the labour force who looked for work, but for less than the full year, whilst the third and fourth lines show those looking for work less than half and less than a quarter of the year respectively.

Interestingly, the last of these lines shows some evidence of a *falling* proportion of the labour force spending only short periods looking for work as unemployment rises. For example, between 1981 and 1983 the proportion of the labour force spending between 1 and 12 weeks looking for work fell from 9.8 to 8.8 per cent. Moreover, the proportion of the labour force looking for work between 1 and 26 weeks does not show any association with the level of unemployment, generally staying within the range of 11–13 per cent over the whole period.

Combining this result with the two conclusions noted above, the following summary of the general relationship between the overall unemployment rate and unemployment durations seems appropriate. *Increases in the overall level of unemployment leads to an increase in the proportion of the labour force experiencing more than half year unemployment, little change in the proportion experiencing some but less than half year unemployment, and consequently a decrease in the proportion of the labour force experiencing no unemployment. This pattern thus implies that increasing unemployment is associated with an increase in the proportion of the unemployed with longer durations.*

Of course, as is also clearly evident from the figures, there is a large degree of year to year fluctuation in unemployment experience not directly related to overall unemployment rates. These fluctuations are presumably due to the precise timing of changes in employment flows (and possibly changing seasonal unemployment patterns), and for females, the strong flows between unemployment and not in the labour force.

Because of the complexities of modelling such fluctuations (particularly the difficulty of merging such results with income unit data), this study draws only upon these general results, rather than the detailed evidence of changes in unemployment experience (and labour market experience generally) from one year to another. As such, the results can only be said to represent changing patterns of labour market

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experience over the year in a very general sense, rather than in a detailed way for each year considered.

#### 4. THE BASE DATA: EMPLOYMENT STATUS AND THE INCOME DISTRIBUTION IN 1985–86

To translate these estimates of labour market trends into descriptions of the changes in the level and distribution of income, data describing the relationship between labour market status and incomes is required. This base data has been derived here from the *1986 Income Distribution Survey* (IDS) conducted by the ABS. Some of the basic results from this survey have already been illustrated in Table 1. However, to derive estimates of the relationship between labour market changes and income distribution, much more detailed information is required.

Ultimately, the reason why estimating the degree of income inequality is interesting is to draw some conclusions about the distribution of economic welfare. This is the rationale for the focus on the annual disposable incomes of the income unit, and it also the reason why the distributional results in this paper are only estimated for a sub-group of the population for whom it is expected that incomes will be a reasonable reflection of welfare levels. This 'restricted population' is defined as income units without atypical incomes (the standard ABS annual income exclusion), with neither head nor spouse working in their own business at any time during the year, not single income unit heads aged under 21 living with their parent(s), and with head aged under 60 years.<sup>15</sup> This restricted population comprises 51 per cent of all income units represented by the IDS (65 per cent of those with head under 60). The key income variable considered is the combined after-tax income of the head and spouse (where present) of the income unit.<sup>16</sup> The relationship between this variable and predominant labour force status for 1985–86 is illustrated in Table 3.

In Table 3 single and dual adult income units (in the restricted population) are separately classified according to their position in the net income distribution and according to their predominant labour market status during the year (the definition of

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15. This last distinction is simply because labour market changes will have little relevance to the older population; see Bradbury (1990b) for the rationale for each of the other exclusions and their quantitative significance.

16. The income of dependents was excluded primarily because the labour market adjustment model could only adjust income unit weights on the basis of head and spouse labour market status. Thus any change in the labour market participation of dependent students is not accounted for.

For persons with recorded income tax greater than 50 per cent of gross income and with gross incomes less than \$50,000 (around 1.6 per cent of the total), or where income tax was not recorded, income tax was calculated on the basis of 1985–86 incomes recorded in the file. The high tax levels presumably reflected higher levels of income in previous years (the average rate of income tax in 1985–86 was only 42 per cent at \$50,000), and so the consequent low levels of net income probably do not reflect the 'permanent' standard of living of these individuals.

TABLE 3: LABOUR MARKET STATUS BY INCOME QUANTILE, INCOME UNITS IN RESTRICTED POPULATION<sup>†</sup>, 1985-86

Predominant Labour Market Status <sup>✧</sup>		Net Income Quintile (For Single Adults and Couples Separately)					TOTAL	
		Bottom Decile	Second Decile	Second Quintile	Middle Quintile	Fourth Quintile		Top Quintile
Single Adult Income Units								
Lower Bound of Quintile (\$)		0	4,817	5,964	9,967	13,316	16,963	0
Mean Net Income (\$)		3,142	5,381	7,902	11,732	15,016	20,835	11,954
Mean Govt Transfers (\$)		2,166	4,221	3,062	747	207	171	1,476
Not in Labour Force	(column %)	51.9	65.8	42.3	7.2	1.9	2.3	22.5
	(row %)	23.1	29.2	37.7	6.4	1.7	2.0	100.0
Unemployed	(column %)	33.2	21.9	13.3	2.8	0.5	0.0	8.8
	(row %)	37.6	24.7	30.2	6.3	1.2	0.0	100.0
Part-Time	(column %)	6.1	7.0	14.7	7.3	2.3	1.2	6.4
	(row %)	9.5	11.0	45.9	22.8	7.2	3.7	100.0
Full-Time	(column %)	8.7	5.3	29.7	82.8	95.3	96.6	62.3
	(row %)	1.4	0.8	9.6	26.6	30.6	31.1	100.0
TOTAL	(column %)	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	(row %)	10.0	10.0	20.0	20.0	20.0	20.0	100.0
Married Couple Income Units								
Lower Bound of Quintile (\$)		1,036	12,348	16,078	20,860	25,368	30,809	1,036
Mean Net Income (\$)		9,585	14,460	18,627	23,071	27,993	37,676	23,871
Mean Govt Transfers (\$)		6,272	1,999	881	630	457	440	1,308
Husband's Status								
Not in Labour Force	(column %)	41.7	13.6	4.0	3.0	1.4	1.3	7.4
	(row %)	55.8	18.3	10.6	8.1	3.8	3.4	100.0
Unemployed	(column %)	40.0	6.9	2.4	0.2	0.0	0.0	5.2
	(row %)	77.1	13.2	9.0	0.7	0.0	0.0	100.0
Part-Time	(column %)	2.7	2.2	1.9	1.1	0.4	1.6	1.5
	(row %)	18.0	14.7	25.7	15.0	5.1	21.6	100.0
Full-Time	(column %)	15.6	77.3	91.8	95.7	98.2	97.1	85.9
	(row %)	1.8	9.0	21.4	22.3	22.9	22.7	100.0
TOTAL	(column %)	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	(row %)	10.0	10.0	20.0	20.0	20.0	20.0	100.0
Wife's Status								
Not in Labour Force	(column %)	87.5	85.4	77.4	53.5	27.5	12.8	51.5
	(row %)	17.0	16.6	30.0	20.8	10.7	5.0	100.0
Unemployed	(column %)	8.2	4.8	2.7	3.8	1.9	0.3	3.1
	(row %)	26.7	15.8	17.7	25.2	12.4	2.1	100.0
Part-Time	(column %)	3.2	5.5	13.3	29.3	28.8	18.6	18.8
	(row %)	1.7	2.9	14.0	31.1	30.1	19.8	100.0
Full-Time	(column %)	1.1	4.4	6.8	13.4	41.7	68.3	26.6
	(row %)	0.4	1.7	5.1	10.1	31.4	51.4	100.0
TOTAL	(column %)	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	(row %)	10.0	10.0	20.0	20.0	20.0	20.0	100.0

Source: ABS, 1986 Income Distribution Survey, Unit Record File.

Notes: † Income units in ABS annual income population, with head aged under 60, with neither head nor spouse self-employed, and not children aged under 21.

‡ Persons looking for work more than half year are categorised as unemployed, otherwise persons are assigned to the other categories according to the state in which they spent most weeks during the year.

predominant status is elaborated in Section 5). The bottom quintile has been further disaggregated because of the concentration of unemployed persons at the bottom end of the income distribution.

The quantile boundaries are interesting in themselves for what they say about the income distribution, and possibly, the limitations of the income survey data. For single adults, the boundary between the first and second deciles falls in the middle of the levels of payment available to people relying upon income support. For those receiving income support for the whole of 1985–86, the base rate of single pension was \$5,068 and the rates of single unemployment benefit were \$4,682, \$4,532 and \$2,600 for adults, those aged 18–20 and those aged 16–17 (and on benefit more than 6 months) respectively (Moore and Whiteford, 1986). The single away from home rate of educational allowances (AUSTUDY since 1986) averaged \$3,692 over 1985–86.

The fact that the average net income for persons in the bottom decile was only \$3,142 thus implies that many of these people in the bottom decile had incomes below these minimum levels for a significant part of the year. The large proportion of this bottom decile who were not in the labour force (52 per cent) partly reflects the fact that around 38 per cent of them were students (aged over 21 or living away from their parents). Educational allowances have parental income tests (even when the student is not living with their parents), which excludes many otherwise low income students from receipt.

Whether these, or other extreme low income people, should be considered as having low welfare levels is difficult to say. If one were to accept that the targeting mechanisms of the Australian income support system incorporated important non-income criteria which permit the identification of the most needy, then this would imply that those persons with incomes below income support levels have welfare levels higher than implied by their incomes alone.

Table 3 also indicates the average level of government cash transfers received by income units in each quantile. Overall, income units in the bottom decile receive only half the level of income support received by income units in the second decile. Moreover, income support payments as a proportion of all income are actually *lower* in the bottom decile compared to the second decile (69 and 78 per cent respectively). Whether this reflects the non-income based targeting of government transfers, or whether it reflects the effects of other restrictions on eligibility (such as waiting periods), or even whether it reflects omissions in the data collection, is not known. As a consequence of this pattern, however, some degree of caution must be exercised when drawing conclusions about economic and social inequality on the basis of the incomes of the bottom decile of single person income units.



These ambiguities do not appear to anything like the same extent for two adult income units. In 1985–86 the base married rate of pension or benefit was \$8,454 (with an additional pension/benefit of \$796 for each child, plus family allowances of between \$274 and \$547 per child). This places married full-year income support recipients (with up to 3 children and no other income) within the first decile of the married couple income distribution. Consequently, around half of income support payments to couples are received by this bottom decile, where they make up around two-thirds of total income.

In general, the relationships between incomes and labour market status shown in Table 3 are as might be expected. Overall, 62 per cent of single adults (including sole parents) were mainly full-time employed, 22 per cent not in the labour force, 9 per cent unemployed and 6 per cent in part-time employment. Over 85 per cent of husbands were employed full-time, with 7 per cent not in the labour force. Over half of wives were not in the labour force, with only one quarter employed full-time, but almost one fifth employed part-time.

Those single adults mainly not in the labour force during the year were concentrated in the bottom two quintiles of the income distribution. The unemployed were also concentrated in the bottom two quintiles, whilst single part-time workers were most concentrated in the second quintile. Full-time workers were concentrated in the top three quintiles, but surprisingly, 1.4 per cent were found in the bottom decile—making up 9 per cent of the total bottom decile population. A similar relationship between labour force status and income category applies to husbands. Only 1.8 per cent of full-time husbands were in income units with net incomes in the bottom decile, but these comprised 16 per cent of all income units in the bottom decile.

There are several possible explanations for these people who were employed full-time but had very low incomes. First, they may be cases who really do work full time but for very low wages (e.g. workers for charitable organisations). Second, they may reflect people working for relatives who receive income in-kind rather than in cash (this is most likely for the single adult income units), or third, they may simply reflect errors in the data.<sup>17</sup>

Apart from their relative absence from the bottom two deciles, husbands working full-time are spread relatively evenly across the top four fifths of the (married couple) income distribution. This is a reflection of the fact that the vast bulk of husbands of working age were working full-time in 1985–86. The greater variability of wives'

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17. The possibility that these low net incomes are due to high levels of income tax rather than low gross incomes is largely excluded by the use of a ceiling in the calculation of tax liability (see Footnote 16).

employment on the other hand, means that it is strongly associated with income unit income. Half of the married couple income units with wife working full-time are in the top quintile, and 83 per cent in the top two fifths of the income distribution. Married couples with wives not in the labour force are relatively clustered in the second quintile.

In terms of family incomes, it might thus appear that the earnings of wives has a regressive impact, with most employed wives being in high income families. However, the presentation of Table 3 is not an appropriate way to judge such issues since a wife's employment implies a higher family income, and hence a higher quantile ranking.

One simple way to evaluate the distributional impact of wives earnings is to compare the 1985–86 situation with the counter-factual of zero wives' incomes. This is done in Table 4 where wife's labour force status and incomes are shown according to their family's ranking in terms of husband's rather than total income. This table shows that married women's participation rates are highest when their husbands' incomes are in the second and middle quintiles, dropping as husbands' incomes increase further. However participation among wives is still lowest for the bottom decile with this decile also having the highest unemployment. Over one fifth of unemployed wives have husbands with incomes in the bottom decile.

Though wives' employment rates fall significantly from the middle to top quintiles, wives' incomes are relatively stable across the top four quintiles of husband's income. This probably reflects the higher wages of wives with higher income husbands (e.g. via associative mating and age associations) together with higher levels of non wage income for wives in the top quintile.

The most notable feature of this table, however, is the significantly lower levels of wives' employment and incomes when husbands are in the bottom quintile of the income distribution. This mirrors the relationship found in Section 3 between the labour force status of husbands and wives. As a consequence, the Gini coefficient of inequality for the combined incomes of husbands and wives is higher than for the incomes of husbands alone (0.217 vs 0.207). However this does not imply a general statement that wives' earnings increase inequality. Since the association between wives and husbands incomes is confined to the very bottom end of the distribution, we might expect this conclusion to vary depending upon the particular summary measure used. For example, the relative standard deviation of combined income is only 96 per cent of husbands' income.

**TABLE 4: WIVES' LABOUR MARKET STATUS BY HUSBANDS' INCOME QUANTILE,  
INCOME UNITS IN RESTRICTED POPULATION, 1985-86**

		<i>Net Income Quantile of Husband</i>						TOTAL
		Bottom Decile	Second Decile	Second Quintile	Middle Quintile	Fourth Quintile	Top Quintile	
Lower Bound of Quantile (\$)		0	8,923	12,957	15,949	18,504	21,613	0
<i>Predominant Labour Market Status of Wife</i>								
Not in Labour Force	(column %)	69.1	56.4	46.7	45.5	48.3	54.4	51.5
	(row %)	13.4	10.9	18.1	17.7	18.8	21.1	100.0
Unemployed	(column %)	6.6	3.6	2.4	1.5	3.5	2.7	3.1
	(row %)	21.7	11.8	15.8	10.1	22.9	17.7	100.0
Part-Time	(column %)	8.4	15.7	19.8	22.5	20.0	19.8	18.8
	(row %)	4.5	8.4	21.1	23.9	21.3	21.0	100.0
Full-Time	(column %)	15.9	24.3	31.1	30.5	28.2	23.2	26.6
	(row %)	6.0	9.1	23.4	22.9	21.2	17.4	100.0
TOTAL	(column %)	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	(row %)	10.0	10.0	20.0	20.0	20.0	20.0	100.0
<i>Mean Quantile Incomes</i>								
Husband's Income (\$)		5,612	11,335	14,558	17,216	19,998	26,446	17,340
Wife's Income (\$)		5,828	5,428	6,780	6,781	6,882	6,582	6,531
Total Net Income (\$)		11,440	16,764	21,338	23,997	26,880	33,029	23,871
Government Transfers (\$)		6,111	2,104	724	547	543	621	1,308

Notes: For definitions and sources see Table 3.

Whilst space does not permit a more detailed examination of this question, it is clear that the effect of wives incomes upon income inequality will depend upon both the association between husband's and wife's income as well as the relative level and variation of the income of wives compared to that of husbands, and so simple conclusions are not likely to be forthcoming.<sup>18</sup>

However, the data in Table 4 do reinforce the conclusion of the previous section, that low probabilities of married women's participation are associated with low levels of husband's income. To assess the implications of the relationship observed in Table 4 for the patterns of income gains and losses associated with increases in wives' participation over the 1980s it is necessary bring the base and calibration data sets together.

## 5. COMBINING THE BASE AND CALIBRATION DATA

Given the income distribution available from this base data, what do the changes in family labour force states described in Section 3 imply for changes in the level and distribution of family incomes over the 1980s? The essence of the static simulation answer to this question was outlined with a very simple example in Section 2. In this section the method used to obtain more detailed results is outlined.

There are two main assumptions that are required in order to use the data described above to simulate the effect of labour market status changes on the income distribution. The first is the conditional independence assumption introduced earlier. That is, within each of the family type/labour force status categories, the distribution of other relevant variables is assumed to remain constant. For example, the level of wages and income tax rates within each category is assumed constant. This is essentially a typical 'ceteris paribus' assumption, but does have important implications where the calibration data are insufficiently detailed. Some errors that arise from the lack of an explicit age disaggregation are noted in the next Section.

18. This point can be illustrated algebraically with the relative standard deviation measure of inequality. Let  $E(h)$  and  $E(w)$  be the means of husbands' and wives' income respectively,  $V(h)$  and  $V(w)$  the income variances, and  $V(h,w)$  the covariance between husbands' and wives' income. The relative standard deviation of husbands' income is defined as,

$$R(h) = V(h)^{0.5} / E(h)$$

with  $R(w)$  defined similarly. Without loss of generality, we can assume that  $E(w) = mE(h)$  and  $R(w) = dR(h)$  ( $m, d > 0$ ). The correlation between husbands' and wives' income,  $r$ , is defined as  $V(h,w) / (V(h)V(w))^{0.5}$  ( $0 \leq r \leq 1$ ). It can thus be shown that the relative standard deviation of the combined income of husband and wife will be given by,

$$R(h+w) = \{ (m^2d^2 + 2rmd + 1)^{0.5} / (1 + m) \} R(h)$$

$R(h+w)$  is thus an increasing function of  $d$  and  $r$ , though its relationship with  $m$  is more complex.  $(\delta R(h+w) / \delta m > 0$  if  $md^2 + rd - mrd - 1 > 0$ . If  $r=0$ , this reduces to  $m > 1/d^2$ ). The actual values of  $r$ ,  $m$  and  $d$  for the population in Table 4 are 0.021, 0.377 and 2.261 respectively.

The second assumption is perhaps even more problematic. This is that it is possible to adequately manipulate the calibration data so as to use it to simulate the base data for different years. Problems arise here because calibration data with the required variables is not available. Whilst the use of income unit incomes over a twelve month period is an appropriate way to examine distributional issues, labour market calibration data are typically collected at either a single point in time (the LFSOCF data) or over a longer period but on an individual basis only (the LFE data). Rather than abandon an appropriate unit for distributional analysis this paper attempts to provide an approximate reconciliation between the trends observed in the LFSOCF survey (described in Section 3) and the base data from the IDS. This is done whilst trying to reflect the general relationships between annual unemployment experience and unemployment rates observed in the LFE data.

#### **Annual Labour Force Status Calculation**

The primary restriction for this calculation flows from the fact that the LFSOCF surveys only refer to June or July of each year. The base (IDS) data, on the other hand, describes the number of weeks during 1985–86 spent in each labour market state. The method used to link these data has two steps. The first step is the calculation of indices which reflect the changes in annual labour force status for each of the different income unit types. The labour market states separately identifiable in the LFSOCF data for each income unit type are, not in the labour force, unemployed, employed part-time and employed full-time. For couples, the 16 cell matrices of the distribution across each of these states for the husband and wife are used (separately for couples with and without dependents). This calibration data thus reflects that presented in Figures 1 to 5. Simple financial year averages have been calculated as the averages of the June or July end-year months.<sup>19</sup>

Secondly, in the base data persons are characterised into one of the four labour market states depending upon their predominant labour market status during 1985–86. However, in view of both the volatility of unemployment status, and the evidence on unemployment experience patterns presented in Section 3, unemployment status is treated differently. People who spent 26 weeks or more looking for work in 1985–86 were classified as unemployed, whilst the remainder of the adult population was classified as not in the labour force, employed part-time, or employed full-time depending upon in which of these three states they spent most weeks.

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19. The actual calibration data of 56 cells for each year (4 labour force states, by 6 single adult income unit types + 16 labour force states by 2 married couple family types) are available in Tables 2 and 3 of Bradbury (1990b).

This method ensures that a rise in unemployment at the expense of full-time employment, for example, is reflected in an increase in the proportion of the population experiencing 26 weeks or more unemployment, and a decrease in the proportion of the population employed full-time for most of the year. The weights of those persons who did not experience half year unemployment, and whose main (other) labour market state was either not in the labour force or part-time employment, remain unadjusted. Because the proportionate reduction of the full-time employed will only be small (since they comprise a much bigger population than those unemployed) the proportion of the labour force with less than half year unemployment will remain roughly constant—ensuring that the general relationship observed in Section 3 is maintained. This of course, is only an approximate method of incorporating annual income aggregation into the model, but without much more detailed (and timely) calibration data it seems the most practical solution.

Given these different definitions in the base and calibration data, it would not be appropriate to assume that the simulated data should exactly match the characteristics of the averaged LFSOCF data. In the simple example of Table 1, the lack of concordance between the base and calibration data was dealt with by making the assumption that the conditional means carried over to the calibration data. This has the disadvantage that even in the base year (1985–86) the simulated mean income is different from the mean income in the base data. To avoid this problem, the re-weighting employed here assumed that *changes* in the calibration data, rather than absolute levels, will be reflected in the simulated data.

#### The Weight Adjustment Procedure

The re-weighting method (carried out separately for each family type) can be summarised as follows. Using the symbol  $+$  to denote summation over the relevant subscript, let

$w_{ijt}$  represent the desired weight for the  $i$ th case in the  $j$ th labour force status category at time  $t$ ;

$w_{ij0}$  the corresponding weight in the base data;

$f_{jt}$  the desired proportion in the adjusted data in category  $j$  at time  $t$ . ( $= w_{+jt} / w_{+++t}$ );

$f_{j0}$  the corresponding proportion in the base data ( $f_{+0} = 1$ ); and

$x_{jt}$  the proportion in the calibration data in category  $j$  at time  $t$  ( $x_{+t} = 1 \forall t$ ).

The simplest way to ensure that changes in the calibration data are reflected in the adjusted base data, whilst also ensuring adding up, is to assume that changes in the proportion of the population category in a particular labour market state (in the calibration data) should produce the same change in the proportion of the adjusted data in that state. This implies that,

$$f_{jt} - f_{j0} = x_{jt} - x_{j0}$$

or

$$f_{jt} = f_{j0} + x_{jt} - x_{j0} \quad (1)$$

Since,  $f_{j0}$ ,  $x_{jt}$  and  $x_{j0}$  are all proportions,  $f_{jt} = 1$ . Given this formulation for the desired proportion, the weights are multiplied by the ratio of desired to original proportions,

$$w_{ijt} = w_{ij0} f_{jt} / f_{j0} \quad (2)$$

It can easily be verified that the total number of cases is not altered by the re-weighting process. However, one limitation of this method is that it can produce negative weights. From equations (1) and (2) it can be seen that negative weights will be defined if the decrease in the proportion in a category in the calibration data is greater than the proportion in the base data. That is, if,

$$-(x_{ij} - x_{0j}) > f_{0j}$$

For the analysis reported here, this situation occurred for only two categories, where the head was unemployed and the wife working part-time, and where the wife was unemployed and the head was working part-time (there were very few cases in these cells in the IDS). To prevent negative weights being assigned, these categories were combined with the corresponding unemployed + full-time employed categories.

#### Comparison with the Labour Force Survey Data

One way to evaluate the success of this re-weighting method is to compare the aggregate estimates of labour market trends predicted by the model with those obtained from an alternative data source such as the monthly ABS Labour Force Surveys (LFS). There are many reasons why we would expect the absolute levels of unemployment and participation rates to be different,<sup>20</sup> but the key question for this paper is how well changes over time are reflected.

However it is not straight forward to compare the LFS estimates with those from the simulated data. Whilst the latter is based on predominant labour market status, the LFS records the unemployment and participation rates at each month during the year. The 1986 IDS does, however, also record the number of weeks spent in different labour market states during the year, and so this data is available for each of the simulated years. Though there are differences in the conceptual basis between these measures and those of the LFS (see Footnote 13) approximately comparable average

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20. The main differences stem from the difference in scope (the LFS covers all persons over 15, whilst the IDS data only refers to income unit heads), and the retrospective measure of employment experience used in the IDS.

**TABLE 5: COMPARISON WITH MONTHLY LABOUR FORCE SURVEY AVERAGES**

	1981-82	Year 1983-84	1988-89
<i>Married Women's Participation Rates (%)</i>			
Monthly LFS data	42.2	42.4	50.3
<i>Difference from 1983-84</i>	-0.2	0.0	8.0
Simulated IDS weekly status	46.0	46.5	53.6
<i>Difference from 1983-84</i>	-0.5	0.0	7.1
<i>Unemployment Rates (%)</i>			
Monthly LFS data	6.2	9.6	6.6
<i>Difference from 1983-84</i>	-3.4	0.0	-3.0
Simulated IDS weekly status	5.9	8.5	6.4
<i>Difference from 1983-84</i>	-2.6	0.0	-2.1

**Notes:** LFS data is the twelve month average from the ABS Labour Force Survey (via dX Data service). Simulated IDS data calculated from the estimated total numbers of person weeks in each labour force state.

annual unemployment and participation rates can be estimated as functions of the total number of person weeks spent in the labour force and unemployed.

Since the re-weighting process does not explicitly take account of the total number of weeks spent in each labour market state (only using predominant status), this is quite a stringent test of the simulation, and in fact the correspondence is far from perfect, particularly for unemployment rates. This is indicated in Table 5 which shows the LFS and simulated estimates for married women's participation rates and overall unemployment rates—the main labour force changes over the period.

For married women's participation, the percentage point changes from 1983-84 are reasonably close, with an over estimate of the changes prior to 1983-84 and a under estimate of about 11 per cent of the percentage point change since 1983-84. The result for unemployment rates, however, is quite different, with a much smaller percentage point change in the simulated unemployment rates in each period than was recorded by the LFS. For the period since 1983-84 the LFS estimates unemployment as falling by 3.0 percentage points, whilst the simulation estimates a fall of only 2.1 percentage points.

There are several reasons for this (these are explained in more detail in Bradbury, 1990b). First, LFSOCF data on which the simulation is based is conducted in June and July, and so was not able to capture the peak of unemployment in the middle of the 1982-83 financial year. This explains about one third of the 0.9 percentage point difference between the two measures. Secondly, a further one fifth of the divergence can be explained as due to a combination of the difference in the demographic structure of the LFS and IDS data (due to coverage difference) together with the



demographic changes over the period which are not accounted for in the model (see Footnote 9).

Finally, just under half of the divergence arises from differences between changes the predominant status and weekly status estimates. That is, unemployment rates calculated on the basis of person weeks unemployed show less change over the period than those calculated on the basis of predominant labour market status. This presumably reflects the fact that the simple method used for assigning predominant status is less than ideal as a method of adjusting for unemployment changes. In particular, by linking changes in unemployment to the weights of all those persons unemployed more than half year, the method implicitly assumes that the relative distribution of unemployment experience within the more than half-year group has stayed constant. However there is some evidence that decreasing unemployment has decreased the proportion of full-year unemployed slightly faster than the proportion of more than half year unemployed.<sup>21</sup> More generally, fluctuations in flow rates over the period mean that predominant status measures can only approximately pick up changes in person-weeks of unemployment during 12 month periods.

These decompositions of the reason for the difference between the LFS and simulated data should be treated as only approximate, as there does seem to be a fair bit of variation from year to year (see Bradbury, 1990b). But in general, in terms of estimating the impact of unemployment falls since 1983–84, the estimates presented in the next section should be considered as lower bounds. The weekly status variable indicates an increase in unemployment between 1981–82 and 1983–84 of only 2.6 percentage points compared to 3.4 percentage points in the labour force survey. Hence one might surmise that a more accurate estimate of the income changes due to the increase in unemployment over this period would be some 30 per cent higher than that shown in the next section. For the period after 1983–84 the discrepancy is somewhat larger (around 40 per cent). Similarly, the increase in married women's participation since 1983–84 is also under-estimated by about 1 percentage point. In this case however, this is a much smaller proportion of the actual change of around 7–8 per cent, and hence of less significance in the interpretation of results.

Whilst these results clearly place important restrictions on the ability of this simulation to describe the precise magnitudes of changes over time, similar limitations are likely to apply to any method which attempts to estimate the effect of annual labour force status patterns using existing data. For the present, simulation methods such as that used here are the best available for the description of the income

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21. Data from the LFE survey, whilst not on a financial year basis, indicates that during 1983 and 1984 the proportion of persons looking for work for more than half year, who were looking for work for the full year was about 44 to 45 per cent. Over the period 1985 to 1988 this proportion has been slightly lower, ranging between 42 and 43 per cent.

changes resulting from labour market changes during the 1980s. This is particularly the case when attention is focused upon distributional outcomes. These results are considered in the next section.

## 6. SIMULATION RESULTS

### Aggregate Trends

Table 6 presents results which are broadly comparable with the simple example of Table 1. The first panel of this table estimates the effect on different income components of the changes in unemployment rates within each family type between 1981–82 and 1988–89. Thus for periods with higher unemployment rates than in 1985–86 the weights on those cases primarily unemployed during the year were increased, whilst the weights for cases mainly employed were correspondingly decreased. The weights for cases with a primarily labour force status of not in the labour force were not adjusted.<sup>22</sup> The counter-factual is that everything except these unemployment rates was constant over the period. Thus, for example, variations in mean wage/salary income over the period occur, not because wage rates change, but because the number of persons employed varies.

The simulation estimates unemployment to have increased by 2.6 percentage points between 1981–82 and 1983–84, subsequently dropping 2.1 percentage points to 1988–89 (Table 5). As a consequence, the model estimates the mean wage income of families to have fallen and then risen by 3.2 and 2.3 per cent over the same period. Government transfers on the other hand, are strongly counter-cyclical, and this is the main reason for the lower level of variation in gross incomes. Finally, (1985–86) income taxes mean that the difference between the net incomes of employed and unemployed will be less than the difference in gross incomes, and so net incomes are estimated to have decreased and then risen by only 2.0 and 1.4 per cent as a result of unemployment changes over the period.

It is interesting to compare these changes to those in Table 1. Because of the under-estimation of unemployment change in the simulation, Table 1 provides a higher estimate of the effect of unemployment changes on gross income. The estimates in Table 6 for the 1981–82 to 1983–84 period are only slightly lower than these simple estimates (2.2 per cent vs 2.5 per cent in Table 1), but for the period since 1983–84 the discrepancy is significantly larger (1.6 vs 2.2 per cent).

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22. For couples, this weight adjustment was undertaken multiplicatively for the husband and wife. Because their labour market states are not independent this is only an approximation (the estimates of unemployment rate change, however, are very similar to those of Table 5 which was based on a full disaggregation).

**TABLE 6: IMPACT OF UNEMPLOYMENT, MARRIED WOMEN'S PARTICIPATION AND OVERALL LABOUR MARKET STATUS CHANGES ON INCOME COMPONENTS, 1981-82 TO 1988-89**

<i>Labour Market Changes Simulated</i>	<i>Mean Income Unit Incomes (1983-84=100)</i>							
	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89
<i>Unemployment Only</i>								
Wages/Salaries	103.2	100.9	100.0	100.9	101.4	101.4	101.4	102.3
Govt Transfers	94.1	98.2	100.0	98.2	97.5	97.5	97.4	95.9
Gross Incomes	102.2	100.6	100.0	100.7	100.9	101.0	101.0	101.6
Net Incomes	102.0	100.6	100.0	100.6	100.8	100.9	100.9	101.4
Net Incomes (Working Age Population)	102.2	100.6	100.0	100.7	101.0	101.0	101.0	101.6
<i>Married Women's Participation Only</i>								
Wages/Salaries	99.6	99.8	100.0	100.3	100.7	101.2	101.5	101.8
Govt Transfers	100.3	100.2	100.0	99.9	99.6	99.3	99.3	99.1
Gross Incomes	99.6	99.8	100.0	100.3	100.8	101.3	101.7	101.9
Net Incomes	99.7	99.8	100.0	100.3	100.8	101.3	101.7	101.9
Net Incomes (Working Age Couples)	99.5	99.7	100.0	100.5	101.4	102.1	102.6	103.0
<i>Unemployment, Participation and Full/Part-Time Employment Changes</i>								
Wages/Salaries	103.4	101.1	100.0	100.8	101.6	101.9	102.0	103.1
Govt Transfers	93.2	97.9	100.0	98.6	97.6	97.3	97.3	95.6
Gross Incomes	102.1	100.6	100.0	100.7	101.5	101.9	102.0	102.9
Net Incomes	101.8	100.5	100.0	100.7	101.4	101.8	102.0	102.8
Net Incomes (Working Age Population)	101.9	100.5	100.0	100.8	101.6	102.1	102.3	103.2

As well as being due to the greater degree of under-estimation of unemployment changes in the latter period, these different patterns over the two periods are also due to the fact that the estimates in Table 1 do not disaggregate changes by demographic group. The reduction in unemployment since 1983 has been greater for some groups than others. Whilst 'children' and persons in group households had unemployment rates in 1989 similar to those in 1981 (Figure 2), the unemployment rates of husbands remained higher. Since this latter group have higher average wages than other groups, this implies a lower reduction in average incomes since 1983-84 than implied by Table 1. Hence the estimates in Table 6 are to be preferred for estimates of the relationship between unemployment changes and incomes—though they may be under-estimates of actual historical changes.

When attention is restricted to the working age population, the variation is naturally more pronounced. Since 1983-84, mean net family incomes of the working age

population are estimated to have increased by 1.6 per cent as a result of the unemployment drop of 2.1 percentage points.

The second panel of Table 6 shows the impact of the changing proportions of married women participating in the labour force.<sup>23</sup> Whilst the changing participation rates of married women had a smaller impact upon aggregate wages than unemployment changes, the fact that most couples do not receive government transfers when the wife is not working means that the increase in family net incomes due to increasing participation has actually been larger than that due to unemployment reductions. Since 1983–84 the increasing participation of married women has increased aggregate family incomes by 1.9 per cent—3.0 per cent for couples of working age.

In one sense this is an over-estimate, as this increased participation has been associated with increased part-time work, and this is not incorporated into the second panel of the table. This factor is however included in the final panel which includes all the labour market status changes described in Section 3. Unemployment and wives' participation have been the most important changes over the period—with the former responsible for most of the change in net incomes between 1981–82 and 1983–84, and both factors important since 1983–84. Over this latter period, changes in full/part-time rates and participation for other groups (and also husband/wife interactions) have tended to decrease incomes—as evidenced by the fact that the total increase in net incomes over this period (2.8 per cent) is significantly less than the sum of the unemployment and wives' participation effects (1.4 and 1.9 per cent). Overall, however, the general trends evident in Table 6 are not all that different from the simple 'back of the envelope' calculations in Table 1. It is only with a more disaggregated analysis that the extra complexity of the simulation method is justified.

#### Average Income Trends by Family Type

Table 7 begins this disaggregation by examining the simulated labour market and income trends of four different family types. The ability to make this disaggregation is the main reason why the LFSOCF data has been used as the calibration data in this study. In order to be compatible with the more detailed distributional results in following tables, this table only refers to the restricted population defined in Section 4—that is, excluding the elderly, the self-employed and income units headed by children aged under 21.

The first panel of the table shows the simulated unemployment, participation, and full-time rates (the latter expressed as a proportion of both the employed and the total population) for each of the family types in 1983–84, together with their estimated

23. The re-weighting for married women's participation is carried out separately for each husbands' labour force category. Non-couple income units had their weights held constant.

TABLE 7: CHANGES IN LABOUR MARKET STATUS AND NET INCOMES BY FAMILY TYPE, 1981-82, 1983-84 AND 1988-89  
(Restricted Population)

Income Unit Type	Simulated Labour Force Rates <sup>♦</sup>				Net Family Income
	Unemploy- ment	Particip- ation	Ft/ Emp.	Ft/ Pop.	
<i>1983-84 Levels</i>	(%)	(%)	(%)	(%)	(\$000)
Couples without Dependents	5.9	72.7	88.7	60.7	24.1
Couples with Dependents	7.9	67.1	83.6	51.7	23.1
Sole Parents	20.6	37.2	78.7	23.2	9.9
Single Adults	13.9	83.1	90.7	64.9	12.0
TOTAL	9.7	71.8	87.0	56.4	17.6
<i>Change, 1981-82 to 1983-84</i>	(Percentage point increase <sup>♦</sup> )				(% increase <sup>†</sup> )
Couples without Dependents	2.0	0.4	-0.3	-1.2	-1.1
Couples with Dependents	3.0	0.3	-0.4	-1.7	-1.9
Sole Parents	7.1	-2.4	-1.4	-4.2	-4.5
Single Adults	3.7	0.4	-0.7	-3.0	-2.7
TOTAL	3.1	0.2	-0.5	-2.1	-2.1
<i>Change, 1983-84 to 1988-89</i>	(Percentage point increase <sup>♦</sup> )				(% increase <sup>†</sup> )
Couples without Dependents	-1.4	3.1	-1.0	2.8	4.1
Couples with Dependents	-1.6	4.0	-3.1	1.9	3.8
Sole Parents	-4.4	7.5	-3.4	4.9	6.1
Single Adults	-3.4	0.3	-0.4	2.5	2.3
TOTAL	-2.2	3.0	-1.7	2.6	2.7

Notes: ♦ Calculated from information on the numbers of weeks in each labour force state for income unit heads and spouses in the re-weighted data. The Ft/Emp. rate is the total number of person-weeks employed full-time divided by the total number of person-weeks employed. The Ft/Pop. rate has the total population (times 52) in the denominator.

♦ The difference between the percentage rates in the two years.

† The percentage increase between the two years (with the 1983-84 value in the denominator in both cases).

mean net family incomes.<sup>24</sup> The second panel describes the changes between 1981-82 and 1983-84, whilst the third describes the changes between 1983-84 and 1988-89. The income changes in the final column reflect the combined impact of unemployment, participation and full-time rate changes (together with husband/wife interactions).

Over both these periods sole parents were the income unit type with the greatest fluctuations of income. During the recession their unemployment rates increased by around 7 percentage points, and their participation rates fell. As a consequence, between 1981-82 and 1983-84 it is estimated that changing labour market conditions decreased the incomes of sole parents by 4.5 per cent. This loss, however, has been

24. Note that the use of the restricted population means that these rates do not correspond to those in Table 5. The participation rate is higher, primarily because of the exclusion of the aged, whilst the exclusion of the self-employed raises the unemployment rate (because the self-employed are not unemployed).

more than made up in the ensuing years, with decreases in unemployment and increases in participation rates (though full-time rates fell).

Couples with dependents had larger unemployment increases than couples without dependents between 1981–82 and 1983–84, though this was partly compensated by slightly greater unemployment falls in the ensuing years. Since 1983–84, participation rates have also grown slightly faster for those couples with dependents. However this participation increase has largely been in part-time employment, with full-time employment rates falling (and full-time/population rates growing only slowly). As a consequence, couples with dependents have fared worse than those without dependents in both periods.<sup>25</sup>

For single adults, the main labour market changes have been in unemployment rates, which increased by 3.7 percentage points between 1981–82 and 1983–84, then fell by 3.4 percentage points to 1988–89. Because this group experienced no significant rise in participation, it is the only income unit type where labour market status changes led to lower incomes in 1988–89 than in 1981–82.

Whilst the overall changes in family incomes with changing unemployment and participation may be only modest, the *distributional* impact is more varied. For example, persons unemployed for a substantial part of the year will in general have very low incomes, and so an increase in the unemployment rate would be expected to increase the size of the low income population, but have little impact on the distribution of income at the top of the distribution. The particular pattern experienced will depend upon the actual family income distributions of unemployed and employed individuals.

#### Mean Quantile Incomes

Table 8 illustrates this variation by disaggregating the results of Table 7 by income quantiles. The first column of the table shows mean incomes for each of the income quintiles in 1983–84, the year of peak unemployment. The bottom quintile has been further disaggregated into the first and second decile. The second and third columns of the table show the estimated percentage change in mean quantile incomes between 1981–82 and 1983–84, and between 1983–84 and 1988–89, respectively. (To permit comparisons between the two periods, all percentage changes have been calculated with the 1983–84 values in the denominator.)

25. The difference between the two family types is in fact probably even greater than indicated in Table 7. Because the re-weighting adjustment used here does not explicitly take into account age distributions, the ageing of the population of couples without dependents implies a violation of the conditional independence assumption. It is estimated that the (algebraic) increase in incomes of couples without dependents should be about 0.2 percentage points higher in each of the two periods. See Bradbury (1990b) for the details of this calculation.

**TABLE 8: TRENDS IN MEAN QUANTILE INCOMES AS A RESULT OF  
LABOUR FORCE STATUS CHANGES, BY INCOME UNIT TYPE  
(Restricted Population)**

<i>Income Quintile of Income Unit</i>	<i>Mean</i>	<i>Percentage Change</i>	
	<i>Income</i> 1983-84	1981-82 to 1983-84	1983-84 to 1988-89
<i>Couples without Dependents</i>			
Bottom Decile	8.5	-5.4	2.5
Second Decile	12.9	-6.7	6.1
Second Quintile	18.0	-2.7	6.7
Middle Quintile	23.7	-0.8	6.4
Fourth Quintile	29.2	-0.1	3.3
Top Quintile	38.9	-0.1	2.1
<i>TOTAL</i>	<i>24.1</i>	<i>-1.1</i>	<i>4.1</i>
<i>Couples with Dependents</i>			
Bottom Decile	10.0	-11.4	3.5
Second Decile	14.6	-5.9	3.8
Second Quintile	18.3	-2.6	4.5
Middle Quintile	22.2	-1.3	4.6
Fourth Quintile	26.5	-0.8	4.2
Top Quintile	36.3	-0.6	2.6
<i>TOTAL</i>	<i>23.1</i>	<i>-1.9</i>	<i>3.8</i>
<i>Sole Parents</i>			
Bottom Decile	3.1	-2.3	7.4
Second Decile	5.4	-1.2	3.3
Second Quintile	6.8	-2.4	3.5
Middle Quintile	8.3	-3.4	5.6
Fourth Quintile	11.2	-8.6	11.0
Top Quintile	19.0	-4.4	4.8
<i>TOTAL</i>	<i>9.9</i>	<i>-4.5</i>	<i>6.1</i>
<i>Single Persons</i>			
Bottom Decile	3.1	-2.9	4.1
Second Decile	5.2	-4.1	4.3
Second Quintile	7.9	-8.1	7.8
Middle Quintile	11.9	-3.1	2.7
Fourth Quintile	15.1	-1.7	1.2
Top Quintile	20.9	-0.9	0.5
<i>TOTAL</i>	<i>12.0</i>	<i>-2.7</i>	<i>2.3</i>

For couples without dependents, the regressive nature of the recession is very evident with the bottom quintile facing much higher average income falls than the middle and top quintiles. Interestingly, the change in income was greatest for the second decile, rather than the first. This reflects the greater homogeneity of the first decile of the income distribution, where most couples had neither head nor spouse employed during the year for any of the years since 1981–82. (Of course these deciles need not contain the same people in each period.)

The very top quintile also experienced a decrease in income with the recession. This does not reflect the fact that some of the income units in this quintile became unemployed (because the quintile ranking is calculated separately for each year), but rather is a result of the general ‘expansion’ of the number of cases at the bottom of the income distribution as a result of increased unemployment—shifting all the quintile boundaries downwards. This then leads to a fall in the average incomes of the top quintiles.

The recovery of employment after 1983–84 reversed some of these changes, though the situation of the lowest decile did not improve nearly as much as might be expected given its income fall during the recession and the general growth in married women’s participation. This is a result of the concentration of families with both members not employed at the bottom end of the income distribution, and the absence of any increase in the participation rates of wives of unemployed husbands—as was noted in Section 3.

The income gain of the second quintile of couples without dependents was, however, particularly large. This reflects the strong impact of the increase in wives’ participation (in addition to the fall in unemployment). Because couples heterogeneous in wives’ labour market status predominate near the middle of the income distribution, their average income level is particularly sensitive to increased wives’ participation. Families at the top of the income distribution were predominantly two earner families in all periods, and so gain little with increasing participation.

A similar story holds for couples with dependents. One feature standing out however, is the 11 per cent drop in the average income of the bottom decile between 1981–82 and 1983–84. This reflects the fact that low income couples with dependents are more likely to be unemployed than couples without dependents, who may be older (though with heads’ below 60 years in Table 8) and hence not in the labour force. The average incomes of low income couples with dependents have recovered somewhat since 1983–84, but again, participation rate changes tended to leave the bottom decile behind the average result.



Sole parents, however, stand out from the other family types as having quite a different distributional pattern of income changes. Here it is the fourth quintile of sole parents who have experienced the greatest fluctuations in incomes as a result of labour force status changes. This reflects the fact that sole parents with lower incomes are more likely to be not attached to the labour force, and so insulated from labour market changes.

Finally, for single person income units, the effects of unemployment changes over the period predominate, with the income increases in the second period roughly mirroring the decreases of the first. Again it is the mean income of the second quintile which fluctuates most with unemployment changes, reflecting the non-participants (and also some low income employed, see Section 4) in the bottom two deciles.

### **Impact on Inequality**

To more directly assess the impact of these changes on income inequality, it is necessary to present the data of Table 8 in the form of income shares rather than mean incomes—drawing upon two well known inequality measurement results. The first of these is that, under quite a general formulation of social inequality aversion, two income distributions with the same mean (or with different means but with welfare judged only in terms of income relative to the mean) can be welfare ranked according to their respective Lorenz curves.<sup>26</sup> The Lorenz curve describes the share of income held by different (lower) shares of the population (e.g. the bottom half). An income distribution with a higher Lorenz curve over the whole income range is thus more equal than its comparison distribution, and by the above result, also yields a higher level of social welfare (*ceteris paribus*).

When income distribution means are not equal, and we do not wish to confine our attention to relative inequality, an analogous result can be obtained from the generalised Lorenz curve. This is simply the Lorenz curve multiplied by the mean of the income distribution. For populations of equal size, comparisons of the generalised Lorenz curve are thus equivalent to comparing the total incomes of cumulative shares of the population. When the generalised Lorenz curve of one distribution is higher for each cumulative population share we can conclude that this distribution reflects a higher level of social welfare. Tables 9 and 10 show the simulated Lorenz and generalised Lorenz curve data occurring as a result of unemployment changes and married women's participation changes respectively, whilst Table 11 shows results describing the overall labour market status changes (i.e. comparable to those in Table 8).

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26. For an introduction to these inequality measures, see Kakwani (1986) and Lambert (1989).

**TABLE 9: CUMULATIVE INCOME SHARES RESULTING FROM UNEMPLOYMENT CHANGES, BY INCOME UNIT TYPE**  
(Restricted Population)

	Cumulative Income Share (Lorenz Curve)			Cumulative Income Share × Mean (Generalised Lorenz Curve)		
	1981-82	1983-84	1988-89	1981-82	1983-84	1988-89
<i>Couples without Dependents</i>						
Bottom 10 per cent	3.61	3.47	3.55	893	840	873
Bottom 20 per cent	9.22	8.76	9.05	2,282	2,119	2,225
Bottom 40 per cent	24.46	23.72	24.20	6,053	5,741	5,947
Bottom 60 per cent	44.32	43.55	44.06	10,969	10,538	10,825
Bottom 80 per cent	68.27	67.77	68.10	16,897	16,402	16,732
Total	100.00	100.00	100.00	24,751	24,201	24,569
Gini Coefficients	0.228	0.238	0.231			
<i>Couples with Dependents</i>						
Bottom 10 per cent	4.61	4.26	4.43	1,104	994	1,049
Bottom 20 per cent	11.12	10.51	10.82	2,662	2,455	2,564
Bottom 40 per cent	27.06	26.34	26.71	6,476	6,152	6,329
Bottom 60 per cent	46.25	45.62	45.94	11,071	10,655	10,888
Bottom 80 per cent	69.08	68.66	68.88	16,534	16,034	16,322
Total	100.00	100.00	100.00	23,936	23,353	23,697
Gini Coefficients	0.198	0.208	0.203			
<i>Sole Parents</i>						
Bottom 10 per cent	3.11	3.18	3.14	320	321	321
Bottom 20 per cent	8.43	8.60	8.50	867	868	868
Bottom 40 per cent	21.92	22.20	22.05	2,256	2,242	2,250
Bottom 60 per cent	38.55	38.89	38.70	3,967	3,928	3,949
Bottom 80 per cent	61.86	61.84	61.84	6,366	6,245	6,311
Total	100.00	100.00	100.00	10,291	10,099	10,205
Gini Coefficients	0.294	0.291	0.293			
<i>Single Persons</i>						
Bottom 10 per cent	2.57	2.56	2.59	318	308	319
Bottom 20 per cent	7.01	6.92	7.03	866	834	865
Bottom 40 per cent	20.95	20.20	20.93	2,588	2,434	2,577
Bottom 60 per cent	40.93	40.11	40.89	5,056	4,834	5,036
Bottom 80 per cent	65.88	65.30	65.85	8,139	7,869	8,109
Total	100.00	100.00	100.00	12,354	12,050	12,315
Gini Coefficients	0.276	0.285	0.276			

TABLE 10: CUMULATIVE INCOME SHARES RESULTING FROM WIVES' PARTICIPATION CHANGES, BY INCOME UNIT TYPE (Restricted Population)

	Cumulative Income Share (Lorenz Curve)			Cumulative Income Share $\times$ Mean (Generalised Lorenz Curve)		
	1981-82	1983-84	1988-89	1981-82	1983-84	1988-89
<i>Couples without Dependents</i>						
Bottom 10 per cent	3.58	3.56	3.44	858	859	859
Bottom 20 per cent	9.03	9.00	8.83	2,164	2,174	2,203
Bottom 40 per cent	24.02	24.02	24.06	5,760	5,805	6,007
Bottom 60 per cent	43.62	43.71	44.19	10,459	10,563	11,030
Bottom 80 per cent	67.77	67.85	68.25	16,249	16,395	17,036
Total	100.00	100.00	100.00	23,978	24,164	24,963
Gini Coefficients	0.235	0.234	0.231			
<i>Couples with Dependents</i>						
Bottom 10 per cent	4.44	4.44	4.31	1,027	1,030	1,033
Bottom 20 per cent	10.85	10.84	10.64	2,506	2,516	2,548
Bottom 40 per cent	26.70	26.70	26.55	6,168	6,195	6,363
Bottom 60 per cent	45.86	45.88	45.89	10,595	10,645	10,995
Bottom 80 per cent	68.72	68.75	68.92	15,874	15,951	16,514
Total	100	100.00	100.00	23,100	23,203	23,961
Gini Coefficients	0.205	0.204	0.205			

Considering unemployment changes first, Table 9 shows that for all family types except sole parents, the recession led to a fall in the income shares of the bottom decile, with this being significantly reversed in the years after 1983-84. The anomalous results for sole parents were discussed above. Excluding them, the cumulative income shares at all quantile levels shown were higher in 1983-84 than in either 1981-82 or 1988-89, confirming the established wisdom that increased unemployment leads to greater relative inequality. Since unemployment decreases average incomes as well as increasing relative inequality, these conclusions are strengthened when the generalised Lorenz curve estimates in the right-hand three columns of the table are considered.

Comparing 1988-89 with 1981-82, the limited unemployment recovery since the recession (see Table 7) means that both categories of couples are estimated to have lower welfare levels in the latter period under either Lorenz measure. This is also reflected in the Gini coefficients. For single persons, both the Lorenz and generalised Lorenz curves cross, and so no conclusive welfare comparison is possible. The Lorenz curves (and hence Gini coefficients) are little different in the two periods, whilst the slightly lower mean income in 1988-89, implies that absolute welfare was greater in 1981-82 for almost all levels of the distribution.

The impact of wives' increasing labour force participation as shown in Table 10 presents quite a different picture. In general there was little change between 1981-82 and 1983-84, and so it simplest to just consider changes over the whole period

TABLE 11: CUMULATIVE INCOME SHARES RESULTING FROM LABOUR FORCE  
STATUS CHANGES, BY INCOME UNIT TYPE  
(Restricted Population)

	Cumulative Income Share (Lorenz Curve)			Cumulative Income Share × Mean (Generalised Lorenz Curve)		
	1981-82 %	1983-84 %	1988-89 %	1981-82 \$p.a.	1983-84 \$p.a.	1988-89 \$p.a.
<i>Couples without Dependents</i>						
Bottom 10 per cent	3.70	3.54	3.48	902	854	874
Bottom 20 per cent	9.38	8.93	8.96	2,287	2,153	2,247
Bottom 40 per cent	24.54	23.88	24.25	5,984	5,757	6,087
Bottom 60 per cent	44.17	43.56	44.37	10,769	10,504	11,135
Bottom 80 per cent	68.12	67.76	68.36	16,610	16,337	17,156
Total	100.00	100.00	100.00	24,384	24,111	25,097
Gini Coefficients	0.228	0.236	0.229			
<i>Couples with Dependents</i>						
Bottom 10 per cent	4.75	4.35	4.34	1,119	1,005	1,039
Bottom 20 per cent	11.33	10.69	10.66	2,666	2,468	2,556
Bottom 40 per cent	27.24	26.50	26.58	6,411	6,121	6,371
Bottom 60 per cent	46.33	45.69	45.91	10,901	10,553	11,006
Bottom 80 per cent	69.01	68.61	68.94	16,240	15,848	16,527
Total	100.00	100.00	100.00	23,531	23,098	23,972
Gini Coefficients	0.197	0.207	0.204			
<i>Sole Parents</i>						
Bottom 10 per cent	3.08	3.17	3.18	320	315	335
Bottom 20 per cent	8.36	8.64	8.49	868	858	895
Bottom 40 per cent	21.79	22.35	21.87	2,262	2,220	2,304
Bottom 60 per cent	38.36	39.11	38.52	3,982	3,883	4,057
Bottom 80 per cent	61.87	61.77	62.20	6,421	6,134	6,551
Total	100.00	100.00	100.00	10,378	9,930	10,533
Gini Coefficients	0.296	0.290	0.293			
<i>Single Persons</i>						
Bottom 10 per cent	2.56	2.55	2.59	315	306	319
Bottom 20 per cent	6.99	6.92	7.05	861	830	865
Bottom 40 per cent	20.88	20.11	20.94	2,572	2,414	2,571
Bottom 60 per cent	40.86	40.00	40.89	5,034	4,801	5,021
Bottom 80 per cent	65.83	65.22	65.83	8,110	7,827	8,084
Total	100.00	100.00	100.00	12,320	12,001	12,279
Gini Coefficients	0.277	0.286	0.276			

1981–82 to 1988–89. Though the Gini coefficient for couples without dependents is lowered as a result of this increasing participation, the Lorenz curves cross and so no unambiguous welfare comparison based on relative income is possible. The main reason for this result is that participation rates for wives with husbands in low income labour force states did not increase by very much over the period. The conclusion to be drawn from the generalised Lorenz curve is, however, different. Because there was *some* increase in wives' participation in all deciles, the generalised Lorenz curve for 1988–89 is above that for 1981–82 at each quantile level for both couples with and without dependents (even if the increase is only very small for the lowest deciles).

The combined effect of unemployment, participation (for all groups) and part-time/full-time employment rates is shown in Table 11. This presents the same data as in Table 8, but in cumulative share form. The pattern of changes between 1981–82 and 1983–84 is very similar to that shown in Table 9, whilst the picture after 1983–84 primarily reflects the combination of the results in Tables 9 and 10.

For couples in the latter period, overall labour market status changes have had different implications for inequality, depending upon whether we consider inequality in relative or absolute terms. From the former perspective, the income effects of changing wives participation lead to the Lorenz curves for 1983–84 and 1988–89 crossing. On the other hand, the increase in mean incomes associated with both the increase in participation and the decrease in unemployment leads to the generalised Lorenz curves for 1988–89 being always above those for 1983–84. These conclusions apply to both couples with and without dependents.

For sole parents, a somewhat different picture emerges from Table 11 than from Table 9 due to their fall in participation with the recession (and subsequent increase in participation—see Table 7). Whilst the Lorenz curves still cross, the changes in mean incomes are such that the generalised Lorenz curves show an unambiguous decline between 1981–82 and 1983–84, followed by an increase subsequently.

## 7. FAMILY INCOMES IN THE 1980S

The main conclusions from this simulation can be summarised as follows. For the working age population, it is estimated that increasing unemployment between 1981–82 and 1983–84 led to a fall in average family net incomes of around 2.2 per cent (Table 6). The subsequent fall in unemployment was only sufficient to increase incomes by 1.6 per cent (by 1988–89). Since 1983–84 however, the impact of married women's participation appears to have produced a larger rise in aggregate incomes than falling unemployment—increasing aggregate incomes by 1.9 per cent, and the incomes of working age couples by 3 per cent. When the combined effect of

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unemployment, participation and full-time employment rates are taken into account, it is estimated that average net family incomes decreased by 1.8 per cent between 1981-82 and 1983-84 but increased by 2.8 per cent up to 1988-89 (the corresponding figures for working age families are 1.9 and 3.2 per cent).

These conclusions need to be tempered by the known limitations of the simulation method used. Unemployment rate changes in particular are under-estimated, and the estimates of the effect of unemployment should be considered lower bounds, with the true changes perhaps up to 40 per cent higher. In addition, the increase in married women's participation has been associated with some decrease in their full-time employment rate, and this should properly be considered as part of the participation increase. In aggregate, therefore, the effect on incomes of the reduction in unemployment since 1983-84 has probably been slightly greater than that of the increase in married women's participation (though for couples the effect of increasing participation has clearly been the main factor).

Given the limitations of the simulation method, it is probably most useful to summarise the estimates of the effect of unemployment in terms of the general relationship estimated, rather than the particular historical pattern. Between 1981-82 and 1983-84 the simulation estimates unemployment rates as increasing by 2.6 percentage points, with the incomes of working age families decreasing by 2.2 per cent (Tables 4 and 5). The corresponding changes in unemployment and incomes since 1983-84 are 2.1 percentage points and 1.6 per cent respectively. In other words, for every one percentage point increase in unemployment, the average annual net incomes of working age families is estimated to decrease by between 0.75 and 0.85 per cent. This is in accord with the 'back of the envelope' estimates in Table 1, from which a corresponding estimate of 0.74 per cent is obtained.

A similar summary statement can be made for the impact of increasing married women's participation. In general, each percentage point increase in married women's labour force participation increases aggregate incomes by 0.27 per cent, and the incomes of working age couples by 0.42 per cent. This assumes that the proportion of employed married women working part-time remains constant.

The main benefits of the simulation method used here, are however, only obtained when a more disaggregated analysis is undertaken. In Table 6, estimates of the income changes flowing from labour market status variations were shown for four different family types. In the period 1981-82 to 1983-84 sole parents fared worse, as their unemployment rates rose and their participation rates fell. However, since 1983-84 they also experienced the largest increase in employment (and hence incomes). With the onset of the recession, couples with dependents had a larger increase in unemployment rates than couples without dependents. Though this also

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was reversed somewhat in the ensuing years, the fact that the increase in the participation of married women with children was predominantly in part-time employment meant that their income increase was less than that of couples without children.

Although all family types still had higher unemployment rates in 1988–89 than in 1981–82 (see Figure 2 and Table 6), increases in the labour force participation of married women and sole parents meant that the average incomes of all family types, except single adults, were higher. The family type with the largest increase in average incomes between 1981–82 and 1988–89 has been couples without dependents—primarily as a result of the strong growth of full-time employment of married women with no children.

Within each family type, however, the impact of the recession and participation changes vary widely. Interestingly, it is not always the very bottom of the income distribution that feels the main impact of unemployment increases. For couples without dependents, for example, it was the second decile which experienced the largest decrease in average incomes between 1981–82 and 1983–84, whilst for single person income units it was the second quintile. This partly reflects the presence of (non aged) persons not attached to the labour force at the very bottom of the income distribution. In addition, however, it also reflects a significant number of cases in the base data with incomes which appear only weakly related to their labour force status (see Section 4). This may represent measurement problems, or at least cases where income levels are a poor proxy for economic welfare. Thus, if anything, these estimates of the changes between 1981–82 and 1983–84 are probably underestimates of the regressive impact of unemployment.

Despite this possible measurement problem, the increases in unemployment in the 1982–83 recession were found to be unambiguously inequality increasing within each of the family types except sole parents. For this latter group, those experiencing unemployment also tend to be those with some earned income, and so increasing unemployment tends to decrease the incomes of those with highest incomes. However the overall fall in mean incomes for sole parents as a result of their unemployment increases and participation falls during the recession was so large as to swamp this effect, leading to a lower generalised Lorenz curve in 1983–84 than in 1981–82 (Table 10).

The impact of married women's labour force participation varies depending upon whether we examine relative inequality or an inequality measure which also takes account of mean incomes. For the former measure (the Lorenz curve) the effect is ambiguous as it is women in middle income families who have gained in relative income share. However the increase in mean incomes as a result of this participation

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increase has been so great as to raise the income levels of all groups—even if the effect is minimal for low income families.

These effects of married women's labour force participation on income inequality essentially derive from the results shown in Section 3. As was noted there, the large increase in participation occurred mainly in families where the husband was already working. In particular, married women with unemployed husbands maintained a low rate of employment over the decade. As a consequence, the bottom deciles of married couples did not share in the income gains associated with the increase in married women's participation in the years after 1983–84. Increasing unemployment led to the average income of the bottom decile of couples with dependents, for example, falling 11 per cent between 1981–82 and 1983–84, but with an increase of only 3.5 per cent in the subsequent years. Middle income couples, on the other hand, experienced only small income falls with the recession, but significant increases thereafter due to increasing wives' participation. High income couples experienced lower income increases as a result of the general increase in wives' participation as they were predominantly two-earner families in all periods.

The implication of these income changes needs to be assessed with some care however. Income from labour market participation is at the expense of reduced home production and/or leisure—and so we would expect the welfare gains to be less than these income changes imply. This qualification does not apply to the same extent for unemployment changes where it might be assumed that constraint rather than choice is the main factor influencing labour market incomes. Whilst a full evaluation in welfare terms of these income changes is beyond the scope of this paper<sup>27</sup> there does seem to be a consensus that this increase in participation is of benefit, to women at least.

The continuing relatively low levels of participation among women with low income husbands, should thus be of concern. In particular, the extent to which this phenomena is a result of the structure of income support for families with unemployed members should be an important item on future labour market and income support research agendas.

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27. In the extreme case, if we were to value non working time using the wage rates of employed women, then the income changes flowing from this increased participation should be entirely discounted. More generally, estimation of the welfare benefits of increased participation would require an evaluation of the extent to which these changes were due to changes in either the constraints or tastes of married couple families. To evaluate the welfare impact of the varying participation increases of married women with different husbands' labour force status would thus require an explicit evaluation of the reasons for this participation difference.



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