



# Wage and Income Inequality in Two Welfare States: Australia and Sweden

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**WAGE AND INCOME  
INEQUALITY IN TWO  
WELFARE STATES:  
AUSTRALIA AND SWEDEN**

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by Peter Saunders and Johan Fritzell

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## **Abstract**

This paper compares aspects and contrasts of income inequality in Australia and Sweden, focusing on the distribution of wage incomes amongst prime aged full-time workers. After some discussion of the economic and labour market contexts of each country, the development of their wages policies is briefly summarised. This is followed by an analysis, using unit record household income survey data for 1990/91, of the factors contributing to overall income inequality in each country, focusing on the role of earnings, self-employment income and government cash transfer payments. A model is then developed to explain the wage incomes of full-time workers in each country and the model is used to make inequality comparisons which adjust for differences in age structure, industry structure and levels of education. The results indicate that taking account of these adjustments leads to remarkably similar distributions of wage income in each country.

# 1 Introduction

International comparisons of income distribution have been greatly facilitated by the advent of ventures like the Luxembourg Income Study (Smeeding, O'Higgins and Rainwater, 1990). Interest in the subject has been further stimulated by recognition of the significance of understanding the processes of income distribution and redistribution in modern societies. This interest has been reinforced by the growing interest in the study of comparative welfare state development and made all the more relevant in the context of the widespread trend towards increased inequality during the 1980s (Atkinson, 1993; Fritzell, 1993). However, whilst we now know a lot more about how different nations compare in relation to various dimensions of income inequality, much of the task of understanding why these differences exist remains to be undertaken.

Such a task is, of course, a major undertaking, one made all the more difficult by the complexities of the underlying situation and the many and varied factors which influence the overall distribution of income. To advance this discussion further, it is necessary to be selective. Others have adopted this strategy in a comparative context by focusing primarily on one element of the total distributional picture. Studies along these lines include research on the impact of different tax-transfer systems on vertical income inequality (Mitchell, 1991), the impact of female earnings on family income inequality (Cancian and Schoeni, 1992) and the numerous recent comparative studies of earnings inequality among prime-aged workers (Gottschalk and Joyce, 1991; Gottschalk, 1993; Green, Coder and Ryscavage, 1992; Bradbury, 1993). These latter studies in particular have the advantage that they focus on that element of income and that section of the population which account for a good deal of the observed increase in market income inequality over the 1980s. Their main focus is, however, on describing the patterns and trends in inequality rather than explaining them. However this is not so surprising in light of the tremendous difficulties in explaining why earnings inequality increased during the 1980s within one country (see e.g. the review on earnings inequality in the United States by Levy and Murnane, 1992).

In this paper, we have chosen to be selective in relation to the range of countries considered, the section of the population included and, for much of the analysis, the concept of income investigated. Our focus is on comparisons between Australia and Sweden, two countries traditionally regarded as at either extreme

of the income inequality spectrum (Saunders and Hobbes, 1988). Despite this, both share a number of common features, particularly in relation to the strength of their trade union movements, their commitment to the pursuit of egalitarian strategies through wage policies and their similarly egalitarian views on perceived and legitimate pay differentials (Svallfors, 1993). We have also chosen to focus on two countries for which we have a good deal of knowledge of the institutional and policy context, and a lot of experience in handling the data. Without this, it is all too easy to misinterpret the data or use them for inappropriate comparisons.

Our main interest is in investigating the distribution of wage incomes among full-time prime-aged workers (aged between 25 and 54 years) in the two countries. This group comprises the bulk of the primary labour force and can thus be expected to be most directly affected by the cumulative effects of past and present wage and other income policies. We investigate wage inequality amongst this group in each country within the broader distributional profile existing within each, and then make comparisons between them. We then proceed to develop a methodology which attempts to provide a basis for a more valid comparison, by adjusting for differences in the prevailing socio-demographic structure within each country. Initial results based on this methodology are presented and analysed.

The paper is organised as follows: in Section 2, we provide some background information on economic and labour market developments in Australia and Sweden during the 1980s. Section 3 briefly describes our data sets and explains the samples derived from them on which our analysis is based. Section 4 describes the income distributions of the two countries by first focusing on male full-year, full-time workers only and gradually extending this to cover the distribution of gross income amongst our entire sample. In Section 5 we develop a regression model to explain wage incomes, use the regression estimates to standardise the observed distributions for differences in the social, demographic and economic structures of the two countries and compare the distributions which emerge from this exercise. The main points to emerge from the study are brought together and summarised in Section 6.

## **2 The Economic And Labour Market Context**

### **2.1 The Economic Context, 1980 to 1990**

We begin with some basic information on the demographic and employment structures in Australia and Sweden. Table 1 shows that, in broad terms, the size of the total Australian population is currently about twice that in Sweden. In terms of age structure, the Australian population is younger overall (OECD, 1988) although this is of less relevance here as our focus is on inequality within the population in a given age range. One characteristic which should be noted from Table 1 is the much higher population growth in Australia during the decade. Both countries experienced a rise in the overall labour force participation rate between 1980 and 1990, due to the sharp rise in female participation. The rate of female participation remains considerably higher in Sweden than Australia, although there was a slight narrowing of the difference over the decade. In relation to the structure of the two economies, the main difference is the larger agricultural sector in Australia and the larger industry sector in Sweden. In both countries, both sectors declined in the 1980s relative to services which grew markedly but remained of very much the same relative size in the two countries.

The changes in income distribution which took place during the 1980s reflect the changing economic conditions of the period, how these were moderated, facilitated and encouraged by the redistributive effects of existing policies and how the policies themselves were altered in response to the changing economic and social environment. Given the central role played in these processes by economic performance generally and by labour market experience in particular, these developments themselves provide an important source of background information against which the more detailed distributional analysis can be juxtaposed. Economic performance is, of course, multi-dimensional which makes any simplified comparisons of questionable validity. Against this, discussion of the full range of economic indicators inevitably runs into difficulties associated with the weights to be attached to each of them. The following analysis is simplified and makes no claim to be definitive. Its intention is to provide a background to the analysis which comes later, not to review in any comprehensive way the comparative performance of the Australian and Swedish economies in the 1980s. We gladly leave that task to others.

**Table 1: Selected Demographic and Labour Force Statistics: Australia and Sweden, 1980 and 1990**

	Australia		Sweden	
	1980	1990	1980	1990
Total population (million)	14.5	17.1	8.3	8.6
Population aged 15-64				
• million	9.4	11.5	5.3	5.5
• per cent	65.1	67.0	64.1	64.3
Labour force participation rate <sup>(a)</sup>				
• total	70.2	74.4	81.0	83.2
• male	87.7	86.1	87.8	85.3
• female	52.1	62.3	74.1	81.1
Percentage of civilian employment in				
• agriculture	6.5	5.6	5.6	3.3
• industry	31.0	25.4	32.2	29.1
• services	62.4	69.0	62.2	67.5

Note: a) Labour force expressed as a percentage of the relevant population aged from 15 to 64.

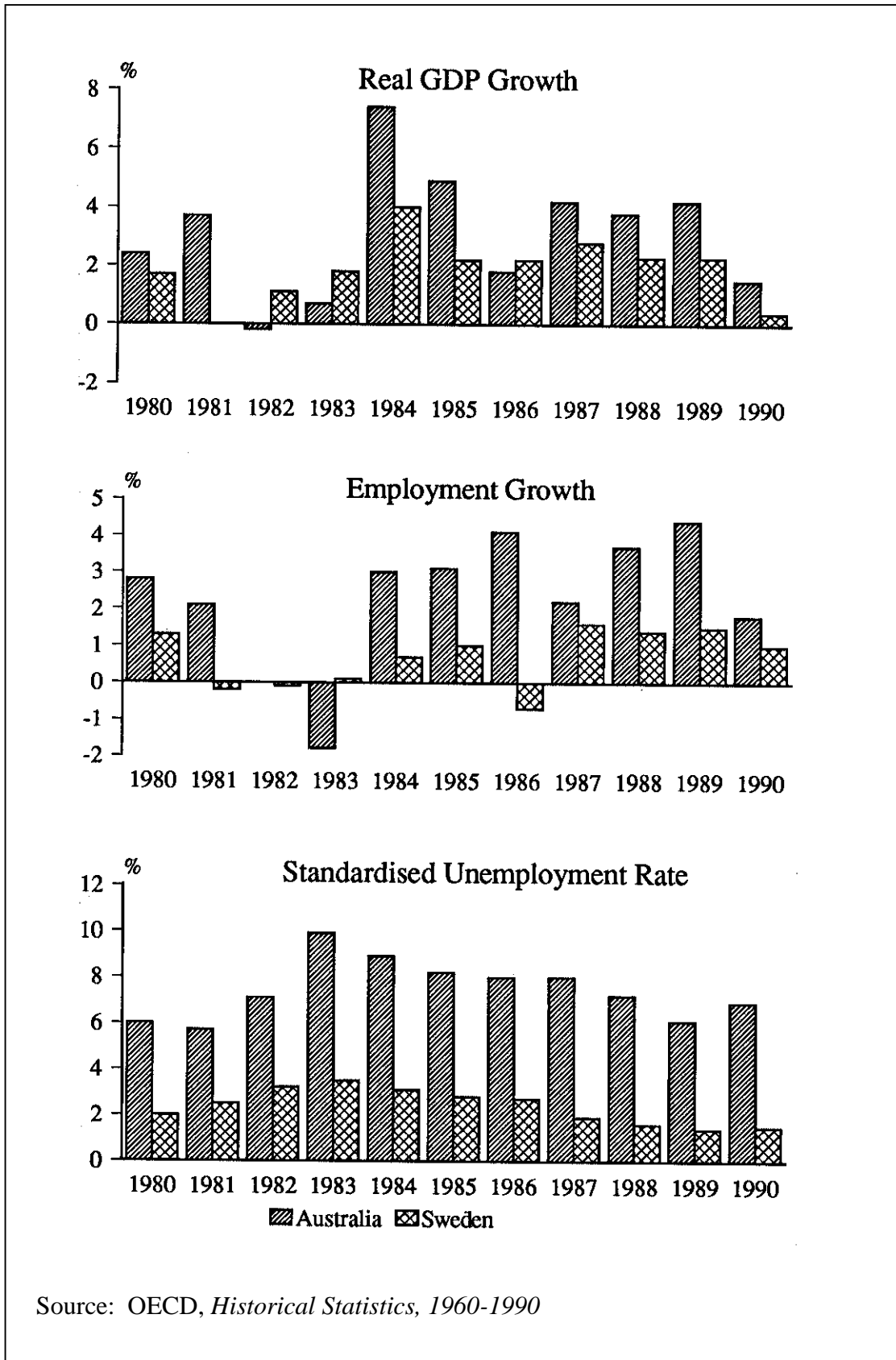
Source: OECD, *Historical Statistics, 1960-1990*.

Figure 1 compares economic performance on three key dimensions: the rate of economic growth, growth in employment and the level of unemployment. In relation to economic growth, it seems clear that Australia out-performed Sweden for most of the decade.<sup>1</sup> In only three years (1982, 1983 and 1986) did Sweden's rate of growth exceed that in Australia. Over the decade as a whole, real GDP grew in Australia by 40 per cent or by 3.1 per cent a year on average, whilst in Sweden it grew in total by less than 23 per cent, equivalent to an average annual growth rate of 1.9 per cent. The difference is even more marked in relation to employment growth, as the middle panel of Figure 1 illustrates.

1 There are, at least, two facts that make this conclusion somewhat uncertain. First, as has recently been pointed out by Korpi (1992), there is a great deal of uncertainty and revision in the published OECD figures on economic growth. Second, the fact that we here do not make any 'per capita adjustments' lead to an overestimation of the difference in economic performance during the decade (compare Table 1).



**Figure 1: Economic Performance in Australia and Sweden**



Total employment in Australia grew by over 28.3 per cent over the decade. The corresponding figure for Sweden was less than a third of this, at 7.8 per cent. Despite these differences, the unemployment rate in Sweden was well below that in Australia throughout the 1980s and there was no noticeable tendency for the two rates to converge. The closest they came was in 1981 when the absolute difference between them was 3.2 per cent, but even then the Australian rate (5.7 per cent) was more than double that prevailing in Sweden (2.5 per cent). The average rate of unemployment in Australia over the decade (7.4 per cent) was more than three times as high as that in Sweden (2.4 per cent).

These differences in unemployment performance reflect the far greater emphasis given in Sweden to the role of manpower policies or active employment strategies in maintaining full employment throughout the post-war period. In contrast, labour market programs have traditionally been given far less emphasis in Australia, where full employment prevailed despite this throughout the 1950s and 1960s. After the oil price rises of the mid-1970s, however, unemployment rose sharply in Australia and has remained high ever since. Even since the election of the current Labor Government in 1983 and the introduction of the Accord (discussed further below) unemployment has remained persistently high (Figure 1). The main strategy embodied in the Accord involved encouraging employment growth through wage restraint, made palatable to working people by increased social spending, reforms designed to improve the equity of the tax system and the expansion of occupational pension schemes supported by generous tax concessions. Figure 1 reveals that whilst the Accord succeeded in generating substantial employment growth, this was accompanied by increased labour supply which greatly moderated the impact on unemployment.

One final feature of Figure 1 is noteworthy in light of the analysis which comes later. It relates to the economic situation at the time of the surveys which form the basis of our analysis of income distribution. In Australia, the income surveys we use refer to incomes in the financial years (beginning on 1 July) 1981-82 and 1989-90. In both cases, these are years which were just prior to the onset of recession, and can thus be regarded as referring to similar points at the downwards side of the peak of the business cycle. The Swedish data, in contrast, refer to the calendar years 1980 and 1990. Whilst the first of these was before the onset of recession of the early 1980s (which began in 1981 in Sweden, a year earlier than in Australia) by 1990 the recession had begun to have its initial effects on the Swedish economy, particularly on the rate of

economic growth. However, it seems unlikely that any effects on the micro-level had appeared by then. For example, the dramatic increase of Swedish unemployment during this decade had not begun in 1990. We therefore are fairly confident that the comparisons are free of any cyclical influences.

## 2.2 Wage Policies

Policies which seek to influence the overall level of wages or the structure of wages amongst different classes of workers (by industry, skill level or gender, for example) have the potential to have far-reaching effects on income distribution. These effects operate through a number of direct and indirect channels, some of them complex and problematic in terms of their magnitude and sometimes even their direction. The most important direct effect operates because wage income continues to be the largest single source of income, in aggregate and for the majority of income units in the economy. However, wage incomes depend both upon the level of wages and on the level of employment, this again being the case for the economy as a whole as well as for the individual workers within it. How wage policies affect the level and pattern of employment - either directly through labour market supply and demand relationships, or more indirectly through effects on aggregate demand in the economy - is thus also critical in determining their overall effects on income distribution. To the extent that wages policies affect unemployment, there will be yet further effects on income distribution to take into account, a proposition for which there is a good deal of support in both Australia (Saunders, 1992) and Sweden (Björklund, 1991), as well as for a range of other countries.<sup>2</sup>

In Australia, wages policy has traditionally played a central role in the distribution and redistribution of incomes. The Australian labour movement has been strong and that strength has been able to influence wage outcomes because of the existence of a highly centralised system of wage determination. Ever since 1907 when the 'Harvester Judgement' set a fair and reasonable wage for a labourer as that necessary to support himself, his wife and up to three children, the links between wages policies and living standards has been an explicit element in the wage determination system. This resulted in what Castles (1985) characterises as the development of a 'wage earner's welfare state' in Australia (and New Zealand), described in the following terms:

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2 Including studies by Blank and Blinder (1986) for the United States, Buse (1982) for Canada and Nolan (1987; 1988) for the United Kingdom.

Wage security for the worker rather than social security for the citizen reflects the emergence of the Australasian working class strategy in the context of early modern capitalism.... The historic compromise between the classes did not centre around a modification of the reward structure of capitalism through the distributive mechanisms at the command of the state, as in the European countries, but focused directly on the primary distribution of income generated by the capitalist market mechanism. (Castles, 1985: 87)

Wage determination in Australia was thus driven by the search for ‘comparative wage justice’, even though at times wage outcomes were constrained by perceptions of the economy’s capacity to pay for them. A second guiding principle was ‘wage compensation’ - the maintenance of the real value of wages as a guaranteed minimalist outcome through indexation of wages to changes in the overall level of prices.

Wages policy in Australia since 1983 has developed very much with these traditional objectives to the fore. Immediately prior to 1983, the conservative government had imposed a wage freeze in an attempt to curtail inflation and encourage a business-led recovery from recession. That strategy met with great unpopularity and eventually with electoral defeat, which saw the election of the Labor Government in 1983. That in turn saw the introduction of the Accord, a corporatist-style incomes policy agreed between the new government and the trade union movement as a central plank of economic policy since then. The Accord attempted (successfully) to moderate money wage growth by guaranteeing the maintenance of real wages through automatic indexation of wages to prices, thus allowing the introduction of a more expansionary macroeconomic policy in order to increase total demand without aggravating inflation.

Until the onset of the recession in 1990, the Accord strategy worked well, facilitating the considerable expansion of employment shown in Figure 1. The Accord itself also proved to be flexible, with six separate versions negotiated between 1983 and 1990 (Stilwell, 1993). Over time, less emphasis was given to guaranteeing the protection of real wages for all workers through universal wage indexation with its replacement by either partial indexation up to a wage ceiling or flat-rate increases, both of which were designed to improve the relative position of low-paid workers. More recently, this has been

accompanied by the tying of wage increases to enterprise-specific increases in productivity, part of a broader strategy designed to improve economic efficiency, raise productivity and increase competitiveness through encouraging flexibility in labour and product markets. Thus, in contrast to Sweden's solidaristic wages policy (see below) in which wage equality was regarded as a strategy for increasing efficiency by driving low productivity firms out of business, in Australia increasing emphasis was placed on workers securing higher productivity as a pre-condition for obtaining increased real wages. Wage equality was seen as the means of securing productivity growth in Sweden, unlike in Australia where productivity came to be seen as the means of securing real wage growth.

In Sweden, the so called solidaristic wage policy has been the leading principle in the wage bargaining system for a long time. This principle is quite contrary to market determination of wages and some of its rationales and consequences are discussed below. The policy, which used to be accepted both by the Swedish Trade Union Confederation (LO) and the Swedish Employer Confederation (SAF), has as a central principle the idea of 'equal pay for equal work'. Thus, wages were basically to be decided in central wage negotiations without regard to the payment ability of individual firms or specific industries.

It is important to realise that the aim of this policy was not purely equality considerations. One of the leading justifications for this policy was its presumed positive influence on efficiency and productivity within the Swedish economy. Thus, for example, by centrally negotiated wages following the principle of solidaristic wage policy, the more unproductive firms and branches would not be able to survive through lowering wages. As a consequence the necessary restructuring of the Swedish labour and product markets was speeded up. However, the active Swedish labour market policy was a prerequisite in order to avoid any resulting increases in unemployment. This policy included programs designed to re-educate the unemployed in order to equip them for the available jobs, along with the introduction of other measures such as mobility grants designed to increase the geographical movements of both jobs and people.

During the late 1960s and the 1970s the solidaristic wage policy in reality meant overall wage compression due to the concentration upon low paid jobs in the centralised wage negotiations. To some extent therefore the principle was changed from 'equal pay for equal work' to 'less unequal pay for unequal work'. It should here, of course, be underlined that this policy was further

reinforced by the introduction of improvements in many cash benefits and of a tax system known for its very high levels and overall progressivity.

What about the distributional consequences of these policies? During the period from the 1960s to the 1980s, data from the Swedish level of living surveys strongly support the view that a rather dramatic decrease occurred in the inequality of both the Swedish wage and income distribution (Åberg, Selén and Tham, 1987; Fritzell, 1991). Analyses conducted by Hibbs (1990; 1991) also indicate that the compression of the Swedish wage distribution during this period was to a large extent due to the specific character of the 'Swedish model' rather than a consequence of changes in the characteristics of the Swedish labour force (resulting, for example, from changes in the distribution of human capital).

During the 1980s, a lot of changes occurred within this overall system and it is today common within Sweden to regard the 1980s as signalling the death of the solidaristic wage policy. This might be a somewhat exaggerated picture since it probably takes quite a while to fully change the fundamental nature of the wage bargaining system. Nevertheless, most changes point in that direction. One of the first signs of the vulnerability of the system was probably the fact that in 1982 the leading union (the Metal Workers' Union) within the Trade Union confederation decided to withdraw from the central negotiations (Åberg 1984). It must also be remembered that since the mid- to late 1970s the SAF has radically changed its attitude towards centralised wage negotiations. The wage negotiations during the latter part of the decade have definitely been less centralised than before. On the other hand Sweden had extremely co-ordinated wage bargaining at the beginning of the 1990s, promoted by the government. However, many believed this reversal of the trend towards a more decentralised system to be a temporary exception.

## 3 Data Sources and Samples

### 3.1 The Income Surveys

The Australian data used in the subsequent analysis are based on two of the three household income surveys conducted by the Australian Bureau of Statistics (ABS) in the 1980s. Both surveys were based on a multi-stage area sample of dwellings representing approximately one-third of one per cent of the Australian population. The sampled population included private dwellings as well as a sample of non-private dwellings (e.g. boarding houses; caravan parks). The method of data collection involved personal interviews with all applicable residents of the dwellings in question.<sup>3</sup> The following were excluded from the applicable population:

- all persons aged under 14 years in 1982 and under 15 years in 1990;
- non-residents, including foreign diplomats and foreign military personnel;
- the institutionalised population (e.g., those in hospitals, prisons etc.); and
- (in 1982) military personnel living in military establishments.

Fieldwork for the surveys was conducted during the periods September to November 1982 and October to December 1990, respectively. The income data collected refer to respondents' incomes both at the time of the survey and over the previous financial year.

Certain categories of people were included on the basis of their current income, but not their period (i.e. financial year) income. These include school leavers, newly-arrived migrants and women who changed marital status during the year. The total sample for 1982 was just over 31,700 persons, representing a population estimate of 11.24 million.<sup>4</sup> The corresponding figures for 1990 were 30,400 and 13.16 million. Calculations based on the surveys would usually

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3 It is difficult to obtain information on the response rates in the ABS income surveys, although Harding (1993) has recently claimed that according to ABS itself, the non-response rate after sample loss was 22.8 per cent for the 1990 survey.

4 Population estimates are derived from the survey samples via the application of weights, which were assigned to each respondent on the basis of their probability of selection within their respective regions. Case weights were adjusted by age, sex and metropolitan/non-metropolitan residence on the basis of monthly population benchmarks. In 1982, the population estimates were those for September, while in 1990 an average of the October, November and December figures was utilised.

involve fewer cases, however, because of data incompleteness and the other considerations mentioned above.

The Swedish data used in the study come from the Swedish Level of Living Surveys. These surveys have been conducted by the Swedish Institute for Social Research on four occasions - 1968, 1974, 1981 and 1991 - and cover a broad spectrum of issues related to welfare and living conditions.<sup>5</sup> In this study we use data from the 1981 and 1991 surveys, focusing on a smaller fraction of the total samples comprising those households consisting of couples in which the male is between 25 and 54 years of age as explained further below. The total samples in each year are representative of the overall Swedish population aged between 15 (18 in 1991) and 75. The non-response rate was 17.6 per cent in 1981 and 20.9 per cent in 1991. Beside the personal interviews, information is collected from different official registers, and the income data used below are based on these latter sources.

### **3.2 Sample Descriptive Statistics**

The income distribution data produced by the surveys described briefly in Section 3.1 cover the entire populations of Australia and Sweden. The task of understanding the distributional differences between the two countries and how these have varied over the 1980s is made difficult by the many factors which impinge upon the overall distributional situation. Different policies in respect of benefits for the aged or young people, for example, combined with different population age and household structures and different patterns of unemployment and/or retirement will affect the overall income distribution in important ways. Unless these factors can be controlled for in some way, comparisons across countries or over time are extremely difficult to interpret. For this reason, the focus for much of the analysis which follows is restricted to a particular sub-set of the population, that consisting of 'prime-aged couples', married couples where the husband is aged between 25 and 54 inclusively. Not only does this approach avoid the complexities of considering the implications of income changes among younger and older people, it also puts the focus of

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5 For a thorough presentation of the three first surveys and results, see Erikson and Åberg (1987). For a short description of the 1991 survey, together with the theoretical and historical background of the level of living approach, see Fritzell (1992). An overview of changes in living conditions in Sweden over the whole period covered by the surveys (1968-1991) is given in Fritzell and Lundberg (1994).



analysis on that group whose involvement in the labour market is strongest, thus allowing the impacts of labour market change and wage determination systems to be highlighted. This is of particular interest in the context of comparisons between Australia and Sweden in light of the background discussion provided in Section 2.

The first step in the analysis thus involved deriving the relevant samples for each country. Initially, all couples where the husband was aged between 25 and 54 years were included, whether they had children or not, and whether they lived alone or with other income units or families. By definition, all units with a husband outside this age range, all single adults and all sole parent families were excluded from the analysis. Those who gave their occupation as being a member of the defence forces were excluded, as were a small number of couples with unusually low or high incomes.<sup>6</sup> No attempt was made to exclude those who might, because of a disability, be prevented from participating in the labour market, although there are not likely to be many in this situation.

Some basic characteristics of the samples thus selected are provided in Table 2. In round terms, the Australian samples contain around 6300 couples while the Swedish samples contain around 2000 couples. Given that the total Australian population is about twice that for Sweden (Table 1), the coverage of the Australian sample is somewhat larger although this is not of any particular significance. The proportions of couples in the two samples with and without children in each country are virtually identical. The main differences in aggregate income composition are the much higher proportion of cash benefit income and the somewhat greater significance of the earnings of wives in Sweden compared with Australia. The former reflects the higher level of transfer spending in Sweden and the latter the somewhat higher female labour force participation (Table 1). In terms of labour force status, Swedish husbands are slightly more likely to be employed than their Australian counterparts. Swedish wives, in contrast, are far more likely to be in the labour force than Australian wives, and once in the labour force, more likely to be in employment.

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<sup>6</sup> Specifically, all couples in which either partner worked full-year, full-time in the survey year yet reported zero wage income were excluded. In Sweden, there was one extreme (high income) outlier couple in the 1980 data which was also excluded.

**Table 2: Sample Descriptive Statistics**

	Australia		Sweden	
	1981-82	1989-90	1980	1990
Number of cases	6313	6201	2013	2101
Weighted sample ('000)	2243.0	2636.0	2164.0	2387.0
Percentage of sample				
• without children	21.6	29.2	21.6	29.1
• with children	78.4	70.8	78.4	70.9
Percentage of income from <sup>(a)</sup>				
• husbands' earnings <sup>(b)</sup>	70.2	64.3	60.1	55.5
• wives' earnings	22.7	25.7	27.8	29.1
• other non-benefit income	4.0	7.1	1.6	2.3
• government cash benefits	3.1	2.9	10.5	13.2
Labour force status of husbands <sup>(c)</sup>				
• employed	92.8	92.6	95.8	95.5
• unemployed	3.7	3.9	2.1	1.9
• not in the labour force	3.5	3.5	2.0	2.6
Labour force status of wives <sup>(c)</sup>				
• employed	51.0	66.7	78.5	85.6
• unemployed	2.7	4.7	1.7	3.0
• not in the labour force	46.2	28.6	19.8	11.4
Percentage of sample according to numbers in employment <sup>(c)</sup>				
• 0 members	5.4	5.1	1.0	2.4
• 1 member	45.4	30.4	25.2	17.5
• 2 members	49.2	64.5	73.8	80.1

Notes: a) These figures are derived from the ratios of the aggregate incomes for the samples as a whole.  
b) Earnings includes wages, salaries and self-employment income.  
c) Employment status is based on current status at the time of the interview. Those defined as employed include the self-employed and those on temporary leave (e.g. maternity leave).

Source: See text.

The differences in the labour force status of wives did, however, narrow considerably over the decade which spans the data sets, as noted earlier in Table 1.

Not surprisingly in light of the above, the incidence of couples where both parties were in employment was much higher in Sweden than in Australia. In both countries the incidence of dual-earner couples increased, though by more in Australia, again causing the differences which existed at the beginning of the decade to be narrowed. By the end of the decade, dual-earner couples were more than twice as prevalent as single-earner couples in Australia and more than four times as prevalent in Sweden.

## 4 Distributional Comparisons

### 4.1 Full-year Full-time Workers

Our comparative descriptive analysis begins by looking at the distributions of wage incomes amongst full-year, full-time (FYFT) workers in each country.<sup>7</sup> This not only provides a useful starting point for the analysis of the broader distributional profile considered later, but it is also of interest in its own right given the different wage determination and labour market policies adopted in Australia and Sweden described earlier. For the moment, we consider males and females separately because we wish to add a gender dimension to the analysis before we turn to distribution of the total income of the couples in our sample.

Table 3A presents the distributions of wage and salary income among FYFT (not self-employed) males in each year for both countries. The Australian results reveal an unambiguous increase in wage income inequality between 1981-82 and 1989-90, reflecting an upwards redistribution towards the top quintile, primarily to the top decile. Over the period, the Gini coefficient (GC) for

Australia

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7 Full-year, full-time workers are defined in Australia to include those who worked for 49 weeks or more during the sample year, at least half of which were worked full-time. In order to gain comparability we have as far as possible tried to make an equivalent definition to the Swedish data. For example, full-time employees on maternity leave are not included in the full-year, full-time sample. Self-employed workers are also in both cases omitted at this stage of the analysis.

**Table 3A: Wage Inequality Among Full-year Full-time Male Workers in Australia and Sweden<sup>(a)</sup>**

Decile	Australia		Sweden	
	1981-82	1989-90	1980	1990
First (lowest)	5.3	5.0	6.0	5.8
Second	6.9	6.4	7.2	7.0
Third	7.6	7.2	7.8	7.6
Fourth	8.3	8.0	8.2	8.1
Fifth	9.1	8.8	8.7	8.7
Sixth	9.8	9.6	9.3	9.3
Seventh	10.6	10.4	10.1	10.1
Eighth	11.6	11.6	11.1	11.2
Ninth	13.3	13.4	13.0	12.9
Tenth (highest)	17.6	19.7	18.5	19.3
Gini coefficient (GC)	0.186	0.215	0.180	0.191
Coefficient of variation	0.356	0.442	0.377	0.419
80/20 Percentile ratio (P80/20)	1.699	1.777	1.585	1.622
Mean incomes <sup>(b)</sup>				
- first decile (m1)	18788	17322	113451	120327
- tenth decile (m10)	61901	68580	345019	396477
- overall (m)	35241	34870	187252	205808
- m1/m	0.53	0.50	0.60	0.58
- m10/m	1.76	1.97	1.84	1.93
Sample size		4039	3945	1579
1594				

- Notes:
- Excludes all workers classified as self-employed at the time of each survey.
  - Mean incomes are expressed in national currencies. Figures for the earlier years have been expressed in prices for the later year by adjusting for movements in consumer prices between the two years.

increased from 0.186 to 0.215, or by 15.6 per cent. Not only did wage inequality increase, but wages fell slightly on average in real terms, the mean wage income declining by just over one per cent. How can this be, given the overall rise in real national income described earlier (Figure 1)? One reason relates to the growth in employment, which meant that total wage income increased even though average wage income declined. In addition, there was a substantial increase in profits over the period. Finally, it needs to be remembered that the sample described in Table 3A represents only a section of the total Australian labour force.

After adjusting for movements in consumer prices, the mean wage income of the lowest decile of Australian FYFT workers declined in real terms by 7.8 per cent, while the real wage income of the top decile rose by 10.8 per cent. It needs to be remembered that these changes do not describe the changing fortunes of a fixed group of workers; the data underlying Table 3A refer to two separate cross-section samples, not to a single panel observed at two points in time. What it does mean, however, is that the lowest-paid Australian FYFT male workers in 1989-90 received less on average in real terms than their counterparts did eight years previously.<sup>8</sup> The different experiences of mean wage incomes at the extremes of the distribution in Australia are of significance, particularly in light of the fact that the Accord was in existence for much of the period and was intended to protect, if not enhance, the relative pay of lower-paid workers.

Wage inequality also increased in Sweden over the 1980s, but by much less than in Australia. Here the main distributional trend was away from the lowest four deciles towards the top three, with the top decile again gaining most. The GC in Sweden increased from 0.180 to 0.191, or by 6.1 per cent, less than half of the increase in Australia. In real terms, FYFT male Swedish workers at all points in the distribution experienced rising wage incomes over the decade, the mean wage incomes of the bottom and top deciles increasing by 6.1 per cent and 14.9 per cent, respectively. The pattern of distributional change in Sweden was thus much the same as that observed in Australia, although the degree of change was less marked.

Regarding comparisons between the two countries, at the beginning of the decade the GC in Australia was very slightly higher than in Sweden although the Lorenz curves intersect making any clear inequality ranking impossible. The degree of similarity in the two distributions at this time is perhaps surprising, given the common perception that Sweden is considerably more equal than Australia - a point considered in more detail below. By the end of the decade, the GC in Australia exceeded that in Sweden by 12.6 per cent and the Swedish Lorenz curve lay wholly inside that for Australia. Wage incomes among FYFT males in Sweden were thus distributed more equally than in Australia by the end of the 1980s, the main difference being the significantly higher share of wage income accruing to the lowest quintile of FYFT workers in Sweden. Not only did Swedish male workers experience a less marked increase

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8 A similar finding for Australia has recently been reported by the OECD (1993).

in inequality than Australian male workers, their average wage incomes also fared much better. In Sweden, the mean wage income rose by 9.9 per cent in real terms; in Australia, it fell by 1.1 per cent.

The corresponding wage distributions for FYFT females are presented in Table 3B. The distributional changes experienced among FYFT females in Australia were much the same as those for males. The degree of wage inequality as measured by the GC rose by 12.2 per cent whilst overall mean wage income fell by 2.1 per cent. The lowest decile of FYFT female workers experienced a decline in real wage income of 11.0 per cent, whilst those in the top decile experienced an average real increase of 2.6 per cent. In Sweden, the direction of the change in inequality is ambiguous because the Lorenz curves for the two years intersect, although all inequality measures increase slightly. Here, the overall mean wage income rose in real terms by 10 per cent. More remarkable is that both the lowest and highest deciles experienced average increases well in excess of this, at 28.6 per cent and 19.7 per cent, respectively, which explains why the direction of the overall distributional change is ambiguous. The average increase in the lowest decile is surprisingly high and it seems likely that part of this increase is explained by our definition of full-time, full-year (see footnote 7). Those working part time during less than six months are included in our sample. Since part-time work among Swedish women was more common in 1980 than ten years later it seems plausible that the lowest decile in 1980 consists of somewhat more part-time workers compared to 1990. Still, the change in distribution among FYFT women in Sweden has an interesting pattern in which those in the middle of the distribution received a much smaller share of total wages in 1990 than ten years earlier. Even though we would not, at this stage, put too much faith in findings from one single analysis one cannot deny that the change in the Swedish distribution is well in line with the popular hypothesis about a 'shrinking middle-class'.

The pattern of male-female wage incomes in the two countries reveals interesting differences. In terms of overall mean relative wage incomes, the differences are not so marked, particularly in the latter year. In Australia the overall mean male/female wage income ratio was 1.40 in 1981-82 and 1.36 in 1989-90. The corresponding ratios in Sweden are 1.34 for both years. Thus there was a substantial premium paid to FYFT male workers relative to FYFT females in

**Table 3B: Wage Inequality Among Full-year, Full-time Female Workers in Australia and Sweden (a)**

Decile	Australia		Sweden	
	1981-82	1989-90	1980	1990
First (lowest)	5.1	4.6	5.0	5.9
Second	7.4	6.9	7.4	7.6
Third	8.1	7.7	8.4	8.1
Fourth	8.7	8.4	9.0	8.6
Fifth	9.2	9.1	9.7	9.1
Sixth	9.8	9.9	10.3	9.5
Seventh	10.6	10.8	10.7	10.4
Eighth	11.6	12.0	11.7	11.2
Ninth	13.2	13.4	12.4	12.8
Tenth (highest)	16.5	17.3	15.5	16.8
Gini coefficient (GC)	0.172	0.193	0.153	0.158
Coefficient of variation (CV)	0.328	0.389	0.296	0.308
80/20 Percentile ratio (P80/20)	1.600	1.723	1.499	1.515
Mean incomes <sup>(b)</sup>				
• first decile (m1)	12697	11304	70918	91230
• tenth decile (m10)	41581	42645	214849	257071
• overall (m)	25143	24603	140065	154077
• m1/m	0.50	0.46	0.51	0.59
• m10/m	1.65	1.73	1.53	1.67
Sample size		1056	1544	521 691

- Notes:
- Excludes all workers classified as self-employed at the time of each survey.
  - Mean incomes are expressed in national currencies. Figures for the earlier years have been expressed in prices for the later year by adjusting for movements in consumer prices between the two years.

both countries, although the premium fell slightly in Australia. In Australia, the mean male/female ratio in the lowest decile was 1.48 in 1981-82, rising slightly to 1.59 in 1989-90. In Sweden, the ratio was far higher, at 1.60, in 1980 but declined to 1.32 by 1990. In the top decile, the Australian ratio rose from 1.49 in 1981-82 to 1.61 in 1989-90. In Sweden it declined from 1.61 in 1980 to 1.54 in 1990. Thus, relative to FYFT males, both the lowest-paid and highest-paid females in Sweden were worse off than in Australia at the beginning of the decade, while the opposite conclusion can be drawn concerning the relationship in 1990.

The ratios presented above are, at least in Sweden, significantly higher than the average wage premiums per hour in the total labour force. For example, le Grand (1991; 1994), has reported that the male/female wage gap is around 20 per cent in Sweden. There are at least two reasons for this anomaly. First, the already mentioned consequence of our definition of full-year, full-time workers. Second, our wage variable includes overtime payments. These 'inclusions' may plausibly both have the consequence of increasing the male/female wage gap.

## 4.2 The Distributional Profile

The results discussed so far refer to a restricted sub-set of our sample which includes non-self-employed FYFT workers only, and to a restricted definition of income which includes wage and salary income only. We now complete our descriptive account of the distributional profiles of the two countries by expanding both the range of people included in the analysis and the definition of income incorporated. The analysis is undertaken sequentially through a series of steps using an approach used recently by Gottschalk and Joyce (1991) and Gottschalk (1992; 1993) and recently applied to Australian data by Saunders (1993). One aim of the exercise is to illustrate the significance of including various individuals (defined by their labour market status) and types of income on the overall distributional outcome in each country. This approach is not only informative of itself, it also facilitates cross-country comparisons, as illustrated in the work of Gottschalk referred to above, and as will become apparent .

Because the amount of information to be analysed is so large, we restrict ourselves to the presentation of summary inequality measures only. We have, however considered a range of alternative measures in an attempt to capture the entire distributional picture. Specifically, we consider the following inequality measures:

GC = the Gini coefficient;

CV = the coefficient of variation (or relative standard deviation);

P80/20 = the ratio of the eightieth to the twentieth percentile;



- m1/m = the ratio of mean income in the lowest decile to the mean income of the distribution as a whole; and
- m10/m = the ratio of mean income in the highest decile to the mean income of the distribution as a whole.<sup>9</sup>

We have also considered the following seven distributions:

- D1 = the distribution of wage income amongst non-self-employed FYFT husbands;
- D2 = the distribution of earnings among all FYFT husbands;
- D3 = the distribution of earnings amongst all husbands;
- D4 = the distribution of the combined earnings of all husbands and wives (i.e all couples);
- D5 = the distribution of gross income minus government cash benefits amongst all couples;
- D6 = the distribution of gross income amongst all couples; and
- D7 = the distribution of equivalent gross income amongst all couples.<sup>10</sup>

The first distribution has already been described and discussed in the preceding section. As we move in sequence from there to successively more complete distributions, we include at each stage more of the sample and/or a broader concept of income. Thus, the move from the first to the second distribution adds in FYFT male self-employed workers and their self-employment incomes (plus any self-employment income received by those in the initial distribution). The next stage brings in all other husbands, those working part-time and/or part-year plus those who were unemployed or not in the labour force for the entire year. By this stage, all husbands are included in

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9 The relative mean income measures are, of course, equal to one tenth of the income shares of the lowest and highest deciles, respectively.

10 We use the OECD equivalence scales, which assign a value of 1.0 to the first adult, 0.7 to the second and subsequent adults, and 0.5 to each dependent child (i.e. children aged under 16).

the analysis, which means that because only couples are covered in the analysis, the sample is now identical to that shown in Table 2.

At the next stage, we include the earnings of all wives, including any negative earnings (i.e. self-employment business losses) among self-employed wives, zero earnings for those outside of the labour force for the year, and the positive earnings of those wives who do participate in the labour force, be it on a part-time or full-time basis. Next we include all other (unearned) income except government cash transfers. Thus, rent, interest, dividends, private pensions and all other private incomes are included at this stage. The penultimate stage includes government cash transfers, which means that the analysis now refers to the total gross income of the couple. Finally, we take account of differences in family size by adjusting gross income using the OECD equivalence scale.

The resulting distributional profiles in Australia and Sweden are presented in Tables 4A and 4B, respectively. We discuss each in turn briefly before comparing the two sets of results. As already explained, the initial distribution is the same as that presented in Table 3A and need not be discussed further. Adding in the self-employed and their self-employment income in Australia has a large impact, making the distribution of earned income amongst all FYFT males much more unequal than the distribution of wage and salary income amongst non-self-employed FYFT males.<sup>11</sup> Adding in all husbands - including part-time and part-year workers plus those unemployed or not in the labour force for the entire year - causes a further widening in inequality, not surprisingly mainly at the lower end of the distribution.

Both of the inclusions discussed so far cause the Lorenz curve to move further from the diagonal and thus lead to an unambiguous increase in measured inequality. The inclusion of wives' earnings offsets this tendency, causing inequality to decline as the Lorenz curve moves inwards in its entirety, this occurring in both 1981-82 and 1989-90, a finding recently noted by Saunders (1993). The addition of all other unearned non-benefit income has little overall effect on inequality, causing the Lorenz curves to move only slightly and to intersect in both years. Not surprisingly, cash benefits cause inequality to decline unambiguously, although the overall effect is not large (a reduction in the GC of just below seven per cent in both years) - a reflection of the relatively low level of government cash benefits in Australia.

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11 This finding is consistent with that produced recently by Green, Coder and Ryscavage (1992) using the LIS data set.

**Table 4A: The Distributional Profile in Australia**

Distribution	Inequality Measure									
	1981-82					1989-90				
	GC	CV	P80/20	m1/m	m10/m	GC	CV	P80/20	m1/m	m10/m
D1. Non-self-employed FYFT husbands; wage income only	0.186	0.356	1.699	0.533	1.756	0.215	0.442	1.777	0.497	1.967
D2. FYFT husbands; earned income	0.257	0.509	1.942	0.249	2.032	0.275	0.579	1.998	0.256	2.213
D3. All husbands; earned income	0.306	0.591	2.289	0.079	2.165	0.324	0.655	2.312	0.064	2.333
D4. Husbands and wives; earned income; all couples	0.295	0.567	2.273	0.141	2.137	0.308	0.599	2.434	0.134	2.212
D5. Gross income minus government cash benefits; all couples	0.295	0.584	2.242	0.173	2.187	0.317	0.660	2.421	0.162	2.364
D6. Gross income; all couples	0.275	0.550	2.182	0.289	2.138	0.295	0.622	2.289	0.280	2.302
D7. Equivalent gross income; all couples	0.316	0.631	2.571	0.258	2.348	0.332	0.692	2.775	0.250	2.460

**Table 4B: The Distributional Profile in Sweden**

Distribution	Inequality Measure									
	1981-82					1989-90				
	GC	CV	P80/20	m1/m	m10/m	GC	CV	P80/20	m1/m	m10/m
D1. Non-self-employed FYFT husbands; wage income only	0.180	0.377	1.585	0.606	1.843	0.191	0.419	1.622	0.585	1.926
D2. FYFT husbands; earned income	0.196	0.401	1.612	0.498	1.877	0.202	0.431	1.641	0.514	1.944
D3. All husbands; earned income	0.242	0.480	1.755	0.237	1.982	0.265	0.528	1.583	0.175	2.077
D4. Husbands and wives; earned income all couples	0.232	0.437	1.948	0.338	1.879	0.247	0.465	2.016	0.261	1.914
D5. Gross income minus government cash benefits; all couples	0.232	0.437	1.923	0.343	1.885	0.249	0.476	2.019	0.272	1.945
D6. Gross income; all couples	0.188	0.363	1.647	0.485	1.763	0.187	0.369	1.588	0.451	1.755
D7. Equivalent gross income; all couples	0.228	0.432	1.938	0.431	1.919	0.225	0.431	1.903	0.400	1.894

Finally, taking account of differences in need, using the OECD equivalences, causes inequality to increase by more than the benefit system caused it to decrease.<sup>1</sup> This last result seems initially somewhat surprising, as the general tendency is for inequality to decline when adjustments are made to unit incomes using an equivalence scale ( Buhmann et al., 1988; Saunders, Stott and Hobbes, 1991). In the current case, however, it needs to be remembered that the initial sample is fairly homogeneous in relation to income unit structure because it excludes all single people, sole parents and those aged under 25 or over 54. We suspect that what is happening here is the result of two separate tendencies. The first is that the use of equivalence scales causes high, two-income couples with children to be brought back towards the middle of the distribution relative to high-income, two-income couples without children, and the second is the depressing effect on the adjusted incomes of large, low, single-income families. The net effect is thus a stretching of the overall distribution, leading to a rise in measured inequality.

The similarities in the distributions of gross income minus cash benefits and of equivalent gross income are as one might expect, given that part of the rationale for the structure of cash benefits is differences in family need which are, to some extent at least, captured in the equivalence scales. Thus the addition of cash benefits raises income by an amount which is similar to its reduction due to the application of the equivalence scales. It is perhaps worth noting, however, that the OECD scales are somewhat rudimentary in that the number of points assigned to each child is constant and no allowance is made for how needs might vary with age, nor of the costs of working incurred by adult family members.

The broad patterns revealed by the distributional profile for Sweden shown in Table 4B are much the same as those for Australia. The inclusion of FYFT self-employed males, self-employment incomes and all other non-FYFT males leads to substantial and unambiguous increases in inequality, as in Australia. Wives' earnings cause a reduction in inequality in 1990 - confirming the recent analysis of Björklund (1992) - and their overall distributional impact in 1990 is somewhat higher than in Australia (a reduction in the GC of about seven per cent compared to five per cent in Australia) However, in 1980, the reduction is ambiguous because of the intersection of the Lorenz curves. Other non-benefit

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1 It should be noted, however, that the Lorenz curves for distributions D5 and D7 in Australia intersect in both years.

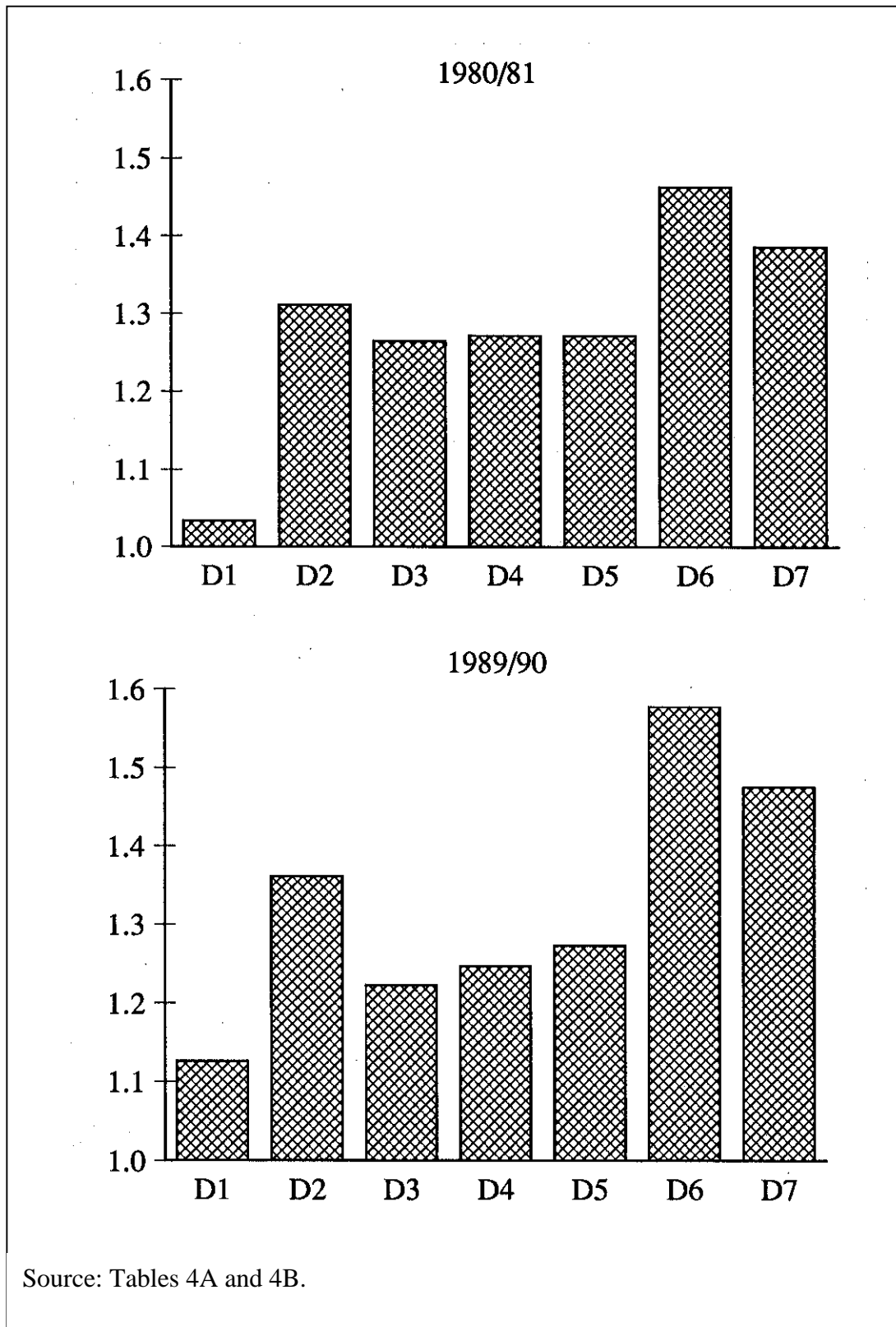
income has only a marginal impact on inequality in both years. Cash benefits, which of course are a much larger fraction of gross income in Sweden, cause inequality to fall considerably (a reduction of about 25 per cent of the GC in 1990) and unambiguously in both years, and the effect of equivalencing the data is to cause inequality to rise. As in the case of Australia, the distribution of equivalent gross income in both years is broadly similar to the distribution of unadjusted income before the inclusion of cash benefits.

Turning now to a comparison of the results in Tables 4A and 4B, the first point to note is that the difference in the degree of inequality in Australia and Sweden depends very much on which distribution is under consideration. Figure 2 illustrates this by showing the ratio of the Australian to the Swedish Gini coefficient for each of the seven distributions defined earlier. It indicates that whilst there is always more inequality in Australia (a finding confirmed by each of the other inequality measures) inequality in Australia exceeds that in Sweden by between 3.3 per cent and 46.3 per cent (in 1980/81), or from between 12.6 per cent and 57.8 per cent (in 1989/90).<sup>2</sup> Which sample is used, and which income concept, thus has a very large bearing on comparisons of inequality in the two countries, which illustrate how different are some of the demographic features and underlying processes of income distribution and redistribution. Most, but not all, of the factors and processes which influence the distributions shown in Figure 2 led to a proportionately larger increase in inequality in Australia than in Sweden over the decade.

Identification of the main factors leading to the different degrees of inequality in the two countries can also be ascertained from Tables 4A and 4B, as well as from Figure 2. In terms of wage incomes amongst FYFT males, Australia exhibits more inequality than Sweden though the difference in the early 1980s is not great. The two factors which have by far the largest differential impact are self-employment and government cash benefits - the former by increasing inequality in Australia considerably more than in Sweden, the latter by reducing inequality in Sweden much more than in Australia. Although the differential impact of the latter of these effects (the cash benefit system) is well-known, the

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2 We use the term 1980/81 to refer to either 1981-82 (in Australia) or 1980 (in Sweden) and the term 1989/90 to refer to either 1989-90 (in Australia) or 1990 (in Sweden).

**Figure 2: Inequality in Australia Relative to Sweden (Ratio of Gini Coefficients)**

effect of the former (self-employment) is less well-recognised and far less understood.<sup>3</sup> It is an issue worthy of more detailed investigation. Thus the main point to emerge from the analysis in this section is that when making comparisons between income inequality in Australia and Sweden, even amongst a relatively homogeneous sub-group of the population, the scope of the income definition and the breadth of coverage of those included in the analysis are critical to any conclusions based on the results. Not surprisingly, inequality is more pronounced amongst our entire sample of prime-aged couples than amongst only those males who worked FYFT and were not self-employed. The inclusion of the self-employed in the analysis makes an enormous difference to the extent of inequality in both countries as well as to comparisons between them. This, combined with the differential impact of government cash benefits, largely explains the quite large observed difference in gross income inequality in the two countries.

The starting point for this analysis was the distribution of wage income amongst FYFT non-self-employed prime aged males in couple families. Although this distribution was strikingly similar in Australia and Sweden in the early 1980s, a considerable difference had emerged by the end of the decade. In the following section we consider in detail the roles of the various factors which can be drawn upon to explain this difference.

## **5 Explaining The Differences**

### **5.1 Method**

The focus of the analysis so far has been primarily descriptive. This has been undertaken in a manner designed to highlight some of the factors underlying the differences in inequality between Australia and Sweden. But there is no sense in which any systematic attempt has been made to explain the extent to which the observable differences in inequality reflect different national socioeconomic structures and characteristics. This task is now attempted. In so doing, we

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3 Green, Coder and Ryscavage (1992, Tables 1a and 1b) do not find the same pattern. The main reason for this discrepancy, however, is that they compare how the distributions of earnings among FYFT males change depending on whether or not you include self-employed workers (but in both cases exclude self-employment income). Furthermore, their analysis using the LIS data base covers all FYFT male heads of households aged 25 to 54, not just those in couple families.



restrict ourselves to the initial distributions described in Section 4.1, i.e. the distribution of wage income amongst non-self-employed FYFT males, details of which are shown in Table 3A.

The basic issue we wish to address is the following: given that the observed distributions in each country are dependent upon a number of features of the social and economic structure of that country, to what extent do the observed distributional differences remain once differences in social and economic structures have been controlled for? Some light on this issue could be shed by undertaking a formal decomposition of inequality and focusing on the differences in within-group and between-group components as between the two countries. Although there is merit in this approach, its purely statistical nature means that it has no explanatory content in a more causative sense. We thus prefer to adopt a more explicitly causal model and have chosen to work within a multivariate regression framework.

One implication of the use of such an approach is that not all of the variation in the data will be explained by the regression model. We see this as an advantage. Given that the model itself contains only those variables identified as important in conventional theories of the determination of wages, the comparative explanatory power of the model in the two countries thus gives a first handle on the relative importance of non-quantifiable, non-economic influences arising from differences in national attitudes and values as they express themselves through labour market institutions and in broader political actions. A second advantage with the regression approach is that it will allow us to construct counterfactual distributions for each country using the wage relationship estimated for the other country. Comparison of these counterfactuals will in turn give an indication of the extent to which the observed differences in inequality can be attributed to differences in socioeconomic circumstances as reflected in the independent variables which enter into the regression model.

Our approach can be explained more formally with the assistance of the following terminology. Let  $W_{iA}$  and  $W_{iS}$  be the observed wage income of (male) individual  $i$  in Australia (A) and Sweden (S), respectively. Our first step involves using a regression model to explain the variation in  $W_{iA}$  and  $W_{iS}$  using a set of conventional (human capital) variables  $Z_{ijA}$  and  $Z_{ijS}$  for Australia and Sweden, respectively. For reasons which will shortly become

apparent, we restrict the set of explanatory variables  $Z_{jA}$  and  $Z_{jS}$  to be identical for both countries. We then use the estimated regression equations to predict wage outcomes ( $W^*$ );

$$W^*_{iA} = \sum_j \beta^*_{jA} Z_{ijA} \quad (1)$$

$$W^*_{iS} = \sum_j \beta^*_{jS} Z_{ijS} \quad (2)$$

and then estimate the wage distributions for each country from these predicted wage outcomes. Stage two involves comparing the predicted wage distributions in each country based on  $W^*_{iA}$  and  $W^*_{iS}$  which are now purged of all elements not explained by the regression model. Finally, we generate a second set of predicted wage outcomes ( $W^{**}$ ) for each country by substituting the values of the independent variables for the other country into the regression model estimated for the initial country. These second set of predictions are thus generated as follows:

$$W^{**}_{iA} = \sum_j \beta_{jA} Z_{ijS} \quad (3)$$

$$W^{**}_{iS} = \sum_j \beta_{jS} Z_{ijA} \quad (4)$$

Equation (3) thus predicts what wage outcomes would be in Australia if its structural wage relationships (represented by the  $\beta_{jA}$ ) were unchanged but if the Swedish socioeconomic structure (represented by  $Z_{ijS}$ ) prevailed. Equation (4) constructs the mirror image set of wage predictions for Sweden. Stage three then involves comparing the two wage distributions generated from the wage predictions based on equations (3) and (4). When these distributions are compared with those based on the predictions from equations (1) and (2), we hope to be able to assess the extent to which the differences in the actual wage distributions can be attributed to differences in the structural wage relationships, differences in the explanatory power of these relationships in each country and differences in the national socioeconomic structures prevailing in each country.

## 5.2 Results

The results that follow represent our initial attempt to apply the above methodology to see what it contributes to understanding the wage income

inequalities shown in Table 3A. We are in the process of refining our methods by including additional variables and hope to report on the outcome of these latter.<sup>1</sup> For the moment, we restrict ourselves to only those variables most often incorporated into earnings functions which we can readily specify in a comparable way from both data sets. We also restrict ourselves to consideration of the wage distributions in the latest year, i.e. 1989-90 in Australia and 1990 in Sweden.

The variables used in the regressions are defined in Table 5, which also presents the sample means for each of them. The regression estimates themselves are presented in Table 6, while Table 7 compares the actual wage income distributions in each country with those based on the wage predictions derived from the regression estimates. The sample means in Table 5 reveal some of the broad differences between the samples in the two countries. In general terms, mean wages are higher in Australia than in Sweden, the Swedish mean wage income converting to A\$30980 using the OECD purchasing power parities for GDP in 1990. The Swedish sample is also slightly older than the Australian sample on average, and is generally somewhat less well-educated. The Australian sample contains more foreign-born individuals, a reflection of its active post-war immigration policy, and is urbanised to a far greater extent than is the case in Sweden. In terms of industrial structure, the main differences revealed in Table 5 are larger percentages of workers in mining and retail services in Australia and the larger percentages working in manufacturing and construction in Sweden. Comparison with the aggregate OECD data in Table 1 suggests that the samples in both countries are broadly representative, with the exception of the slight under-representation of those employed in agriculture. This probably reflects the prevalence of farm workers outside of the sample age range (25 to 54 years) plus the fact that self-employed farmers have also been excluded from the sample.

By way of additional background material, Figure 3 compares the relative mean wage income profiles by age in Australia and Sweden. This reveals a steeper profile and a somewhat later wage income peak in Sweden. Relative to male

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1 Two additional variables which we plan to include in future work are a social class measure which is comparable across both countries given the limitations of our data, and a variable indicating whether the worker is located in the public or private sector.

**Table 5: Regression Variables: Definitions and Sample Means<sup>(a)</sup>**

Variable Name	Description	Sample Mean	
		Australia	Sweden
WAGEINC	Annual wage and salary income (dependent variable)	\$34,880	SK 208153
AGE	Age in years (mid-point of age range)	38.7	40.8(b)
EDUCOTH	Education: less than HSC	28.7	35.4
EDUCHSC	Education: Higher School Certificate (matriculation standard)	10.6	10.0
EDUCCTDIP	Education: certificate or diploma (including Trade Certificates)	44.2	40.0
EDUCDGREE	Education: university degree (or similar)	16.5	14.7
FORBORN	Foreign-born	29.3	9.8
URBAN	Residing in urban location	66.8	26.7
AGRIC	Industry: agriculture	1.8	2.2
MINING	Industry: mining	3.1	0.5
MANUF	Industry: manufacturing	22.4	30.9
UTILS	Industry: utilities	3.6	1.5
CONSTR	Industry: construction	7.5	13.0
RETAIL	Industry: retail	13.9	7.2
TRANSP	Industry: transport	8.0	6.4
COMMS	Industry: communications	4.1	3.6
FINANCE	Industry: finance	8.6	9.3
PUBADM	Industry: public administration	8.7	6.8
COMSERV	Industry: community services	15.1	14.3
REC	Industry: recreation	3.2	4.1

Notes: a) All variables except WAGEINC and AGE appear in the regression equations zero-one dummy variables.  
b) Based on actual age in years.

**Table 6: Annual Wage Income Regression Results<sup>(a)</sup>**

Independent Variable	Estimated Coefficients:	
	Australia 1989-90	Sweden 1990
Intercept	1431	-108378
AGE	1311*	10877*
(AGE) <sup>2</sup>	-10*	-98*
EDUCOTH	REF(b)	REF(b)
EDUCHSC	3838*	54315*
EDUCCTDIP	4672*	35899*
EDUCDGREE	17130*	128500*
FORBORN	-3437*	-55305*
URBAN	2998*	25864*
AGRIC	-9287*	-28112
MINING	13678*	20574
MANUF	REF(b)	REF(b)
UTILS	-917	4653
CONSTR	-1174	1888
RETAIL	-1697*	14284
TRANSP	241	7158
COMMS	-1696	1483
FINANCE	6158*	35643*
PUBADM	-2523*	-1635
COMSERV	-3734*	-30685*
REC	-1537	-46922*
R <sup>2</sup> (adjusted)	0.219	0.326

Notes: a) An asterisk (\*) indicates statistical significance at the five per cent level.  
b) REF = Reference category.

FYFT workers aged 25 to 29 years, those aged between 45 and 49 years in Sweden on average received wage incomes which were 37.4 per cent higher; the corresponding differential in Australia was only 20.3 per cent.<sup>2</sup> These different

2 This finding is rather surprising in light of Swedish wage policy. According to le Grand (1994) the age premium in Sweden is considerably lower than in either the US or Japan, and it is often claimed in Sweden that the age-earnings profile is too flat. One should, however, note that it is particularly the relatively small wage differentials between the youngest fraction of the labour force and the others which has been under debate in Sweden. These people are not included in our analysis since we have excluded those below 25 years of age.

**Table 7: Actual and Predicted Wage Income Distributions**

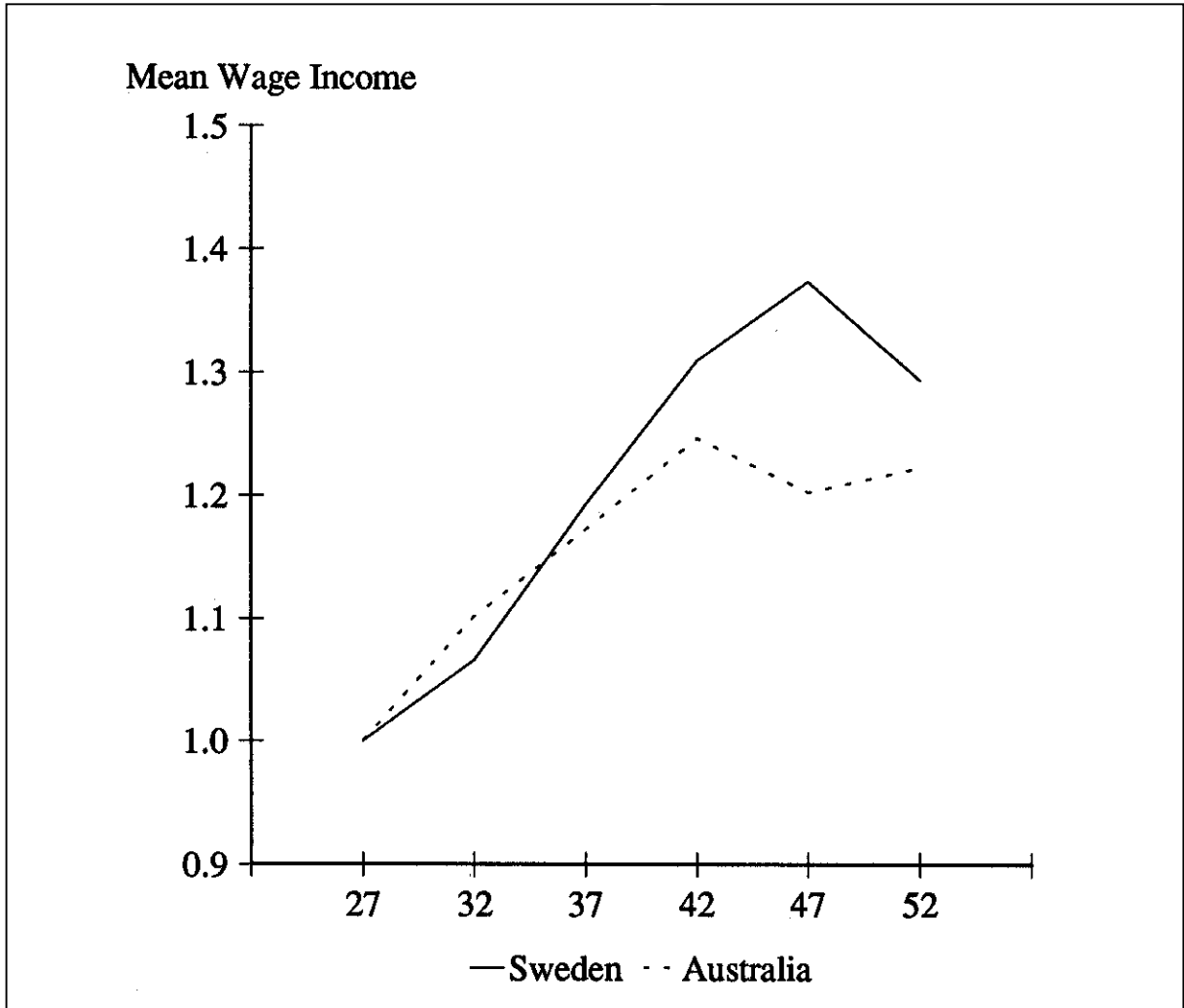
Decile	Australia			Sweden		
	Actual	Predicted <sup>(a)</sup>	Difference	Actual	Predicted <sup>(a)</sup>	Difference
First	5.0	7.0	-2.0	5.9	6.2	-0.3
Second	6.4	8.1	-1.7	7.0	7.8	-0.8
Third	7.2	8.6	-1.4	7.5	8.4	-0.9
Fourth	8.0	9.1	-1.1	8.0	9.0	-1.0
Fifth	8.8	9.4	-0.6	8.4	9.2	-0.8
Sixth	9.6	9.8	-0.2	9.3	10.0	-0.7
Seventh	10.4	10.3	+0.1	10.0	10.5	-0.5
Eighth	11.6	11.1	+0.5	11.3	11.3	0.0
Ninth	13.4	12.5	+0.9	13.0	12.5	+0.5
Tenth	19.7	14.3	+5.4	19.5	15.2	+4.3
GC	0.216	0.115	+0.101	0.194	0.136	+0.058
CV	0.443	0.209	+0.234	0.422	0.247	+0.195

Note: a) The predicted distributions are derived from the regression estimates in Table 6.

profiles will, of themselves, influence the distribution of wage incomes in the two countries and could, in principle at least, account for some of the distributional differences described earlier. However, the age structures in the two countries are also different, as are a range of other factors (Table 5). The question at issue is the extent to which these differences can account for the different observed distributions. We now turn to this issue.

The variables defined and described in Table 5 were used to derive the regression estimates shown in Table 6. With the exception of the variables WAGEINC and AGE, each of the other variables was entered into the regression model in the form of a zero-one dummy variable. For Australia, the estimated age variables indicate a pattern of wage incomes which vary with age according to the expected inverted U-shaped profile. The age at which earnings are predicted to reach their maximum value is 56.5 years, outside of the age range of the sample. The main human capital variables, represented by the education variables are all positive and statistically significant and the

**Figure 3: Wage Income Age Profiles for Australia and Sweden (1989/1990). Full-year, Full-time, Non-self-employed Males**



coefficients conform to the anticipated pattern.<sup>3</sup> Workers born outside of Australia have significantly lower wages than those born in Australia, even after adjusting for other factors influencing wage incomes. The average difference between the wage incomes of Australian-born and foreign-born wage earners across the entire sample is of a similar order of magnitude to the estimated returns from successful high school matriculation. Those living in urban areas had significantly higher wage incomes than others, the effect again being quite

3 Initial experimentation with a rather crude experience variable, equal to the difference between age and the total estimated years of education minus five, produced encouraging results but was not persisted with because of collinearity between the age and experience variables.

large in numerical terms. The main significant industry effects in Australia were in agriculture, retail, public administration and community services, in each of which the estimated impact on wage incomes was negative, and mining and finance where the estimated effect was positive. Despite the significance of a number of the variables, the overall explanatory power of the model is low, the adjusted  $R^2$  being only 0.219. This is disappointing in light of the objectives of the current exercise, although it is an interesting finding in its own right.

The pattern of regression results for Sweden is broadly similar to that for Australia. Again, both age variables are significant and the predicted age at which wage incomes are at a maximum is 55.5 years - almost identical to that in Australia. The education variables are again all significant, although the estimated coefficients display a different pattern to that revealed for Australia. In particular, the estimated return to certificate and diplomas, and to degrees are much lower in Sweden relative to high school matriculation (or matriculation has a higher return relative to post-school, non-degree qualifications) than is the case in Australia. As in Australia, foreign-born workers earn less than Swedish-born workers and those living in urban areas earn more than others. Again as in Australia, the negative effect attached to foreign-born workers in Sweden is of a similar size to the positive returns to high school matriculation. Generally, fewer of the industry variables are statistically significant in Sweden than in Australia, the only significant industry coefficients being the positive effect applying in the finance industry and the negative effects of 'community services' and 'recreations'. However, despite the fact that fewer estimates are significant in the Swedish regression, the explanatory power of the model exceeds that in Australia, the adjusted  $R^2$  in Sweden (0.326) being around 50 per cent higher than that for Australia (0.219).

Despite the low explanatory power of the regression models in Table 6, we have nonetheless proceeded to use them to predict wage incomes in each of our two samples and derived a predicted distribution of wages from these predictions. The results of this exercise are shown in Table 7. Not surprisingly in light of their low explanatory power, neither model does very well at predicting the actual distribution of wage incomes. In both countries, the predicted distribution exhibits considerably more equality than the actual distribution. In Australia, the absolute prediction errors are largest in the higher decile, but they are also substantial in the lowest four deciles. In Sweden, the prediction error is



also largest in the highest decile, but it is also considerable in the second to sixth deciles. Overall, the extent of inequality in the predicted Swedish distribution, as measured by the GC, is 30 per cent below that for the actual distribution. In Australia, the corresponding decline is by 47 per cent. This result is of course strongly related to the difference in explanatory power between the models. As a consequence, the inequality rankings of the two countries is actually reversed if the predicted wage distributions are substituted for the actual distributions.

How are we to interpret these findings? At one level, they reveal a good deal about our ignorance concerning identification of the factors which influence wage incomes in the two countries. Clearly, there is more to the determination of wage incomes than those influences which are captured in the independent variables included in our wage model. Some of these factors will be specific to individuals but difficult to measure in any precise or accurate way, including ambition, motivation, good (or bad) fortune, and so on. Others will include the impact of general factors which have distributional consequences, which include, for example, wage policies and other labour market interventions.<sup>4</sup> No doubt there are a range of other omitted factors which can also be drawn to attention.<sup>5</sup>

We now turn to our final distributional comparisons, those based on the predictions derived from equations (3) and (4), respectively. Recall that for each country, these distributions are derived by substituting the values of the independent variables in the other country into the initial country's estimated wage income regressions. For our purposes, they represent a counterfactual distribution against which to compare each country's predicted wage distribution derived directly from the predictions based on equations (1) and (2), respectively. For completeness, we show both sets of predicted distributions in each country in Table 8, as well as the actual observed distributions.

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4 We exclude from this list those policies which affect relative wages in different industries, because these should be reflected in the industry coefficients estimated in the regression models and hence incorporated into the predicted wage distributions.

5 In the Swedish case we have found that a simplified version of the well-known class scheme used by Erikson and Goldthorpe (1992) explains around 30 per cent of the variation by itself while increasing the adjusted  $R^2$  to about 0.4 in the total model.

**Table 8: Actual, Predicted and Counterfactual Wage Income Distributions<sup>(a)</sup>**

Decile	Australia			Sweden		
	Actual (WA)	Predicted (W*A)	Counter- factual (W**A)	Actual (WS)	Predicted (W*S)	Counter- factual (W**S)
First	5.0	7.0	7.4	5.9	6.2	5.7
Second	6.4	8.1	8.3	7.0	7.8	7.3
Third	7.2	8.6	8.7	7.5	8.4	8.1
Fourth	8.0	9.1	9.1	8.0	9.0	8.8
Fifth	8.8	9.4	9.2	8.4	9.2	9.5
Sixth	9.6	9.8	9.7	9.3	10.0	10.1
Seventh	10.4	10.3	10.1	10.0	10.5	10.8
Eighth	11.6	11.1	10.6	11.3	11.3	11.7
Ninth	13.4	12.5	12.4	13.0	12.5	12.8
Tenth	19.7	14.3	14.4	19.5	15.2	15.3
GC	0.216	0.115	0.105	0.194	0.136	0.153
CV	0.443	0.209	0.196	0.422	0.247	0.272

Note: a) See the main text for an explanation of how these distributions were derived.

We have already commented on the national differences between the actual and predicted distributions. We focus now on comparison of the predicted and counterfactual distributions, both within each country and then between them. For Australia, the two distributions are quite close, but although the Gini coefficient declines from 0.115 to 0.105, the Lorenz curves intersect (in the eighth decile) so the inequality ranking of the two distributions is not clear-cut. Aside from the first and eighth deciles, none of the absolute differences in decile shares exceeds 0.2 percentage points, which suggests that the differences in socio-demographic structure between Australia and Sweden have little effect on the Australian distribution.

For Sweden, the overall picture is much the same, although the effects of course are now in the opposite direction. In this case, the counterfactual distribution is more unequal than the predicted distribution and the Gini coefficient increases from 0.136 to 0.153, or by 12.5 per cent. The largest decile share differences again occur in the first and eighth deciles, although there is also a large effect in the second decile. Unlike Australia, the Swedish evidence thus suggests that

socio-demographic differences do explain a non-negligible fraction of the difference in income inequality between the two countries.

This last proposition is reinforced when we consider comparisons between the two countries. Remember that the pure difference in inequality between the countries according to the Gini coefficient was 0.022 (0.216 minus 0.194). Applying the Australian characteristics to the Swedish data - the counterfactual distribution - increased inequality in Sweden by 0.017 (0.153 minus 0.136). Thus, nearly 80 per cent of the original difference between the countries disappears.

Another type of comparison is to note that the Australian predicted distribution is more equal than the Swedish predicted distribution, with a Gini coefficient which is 15.4 per cent lower. This difference becomes more substantial when we compare the two counterfactual distributions, the Australian Gini coefficient in this case being 31.4 per cent below that for Sweden.<sup>6</sup> On the basis of these calculations, therefore, it seems that socio-demographic differences between Australian and Swedish FYFT male workers have the effect of making the distribution of wage incomes in Australia more unequal relative to that prevailing in Sweden. Given that the observed distributions of wage income in the two countries are in any case quite similar (although the distribution is more equal in Sweden, where the Gini coefficient is 10.2 per cent lower than in Australia), our (admittedly tentative) conclusion is thus that most of the observed differences in the distributions of wage income in Australia and Sweden are due to the different socio-demographic structures in the two countries. Aside from these differences, wage incomes - at least among FYFT male workers - are distributed virtually identically in the two countries.

## 6 Summary and Conclusions

We have already discussed our results at some length and do not need to repeat that discussion here. We should emphasise again, however, that the approach developed in Section 5 should be regarded as an initial attempt and we hope to

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<sup>6</sup> The proportionate differences in the coefficient of variations (CV) are of a similar order of magnitude. This is not surprising because the CV measure is more sensitive to changes at the top of the distribution, yet Table 8 reveals that the differences at the top of the distribution are quite small.

further refine the methodology in the future. We nonetheless believe that our analysis already reveals several interesting features of the distributions of income amongst prime-aged couples in Australia and Sweden. In particular, the results in Section 4 highlight the factors which contribute most to the differences in gross income inequality in the two countries. Beginning from two distributions of wage incomes among full-year, full-time male workers which are not that different, the two main factors which explain the differences in the gross income distributions are self-employment and the impact of government cash benefits. The different distributional incidence of these two factors largely explains how wage income distributional similarity translates into gross income distributional difference.

In Section 6, we focus on comparison of the distributions of full-time male wage incomes and attempt to take account of the differences in the socio-demographic structures of the two nations. The regression model estimated as part of this exercise produces results which are of themselves of interest, particularly in relation to the degree of variation left unexplained in both countries and the differences between them. Despite this, application of the estimated models to adjust for the effects of socio-demographic differences leads to the conclusion that the distributions of wage income in Australia and Sweden are remarkably similar once these adjustments have been made. This dimension of similarity leaves the differences in the distributions of gross income in each country all the more striking.

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