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The Distribution of Welfare: Inequality, Earnings Capacity, and Household Production in a Comparative Perspective

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Abstract

The use of data from the Luxembourg Income Study (LIS) has greatly improved comparative analysis of the distribution of monetary incomes in industrial nations. The differences which emerge from studies using the LIS data raise new questions about why they exist and what nation-specific factors they reflect. This paper explores the role of differences in attachment to the labour force in explaining observed differences in the degree of inequality of income. A human capital model is used to estimate the earnings capacity of the individual members of couples aged between 25 and 55 in five countries: Australia, Canada, (West) Germany, the Netherlands and the United States. Because non-participation in paid work is often associated with (unpaid) domestic work (or household production) the earnings capacity estimates can be interpreted as proxies for the value of domestic production estimated using the opportunity cost method. Having derived the estimates of earnings capacity, these are used to replace the actual earnings (whether zero or positive) of the individual members of prime age couples and the resulting distributions of earnings capacity and actual earnings are compared. These comparisons reveal that the differences are substantial in absolute terms. They also indicate that the main patterns to emerge from cross-country difference in the distributions of actual earnings (and incomes) do not reflect different levels of labour market attachment in each country. When differences in labour force attachment are held constant by comparing earnings capacity, a clearer inequality ranking of countries emerges, but not one which differs from that based on the actual distribution of market earnings.

1 Introduction

The Luxembourg Income Study (LIS) project has for the last decade been involved in the reorganisation and recoding of national unit record data on household incomes into a common conceptual and methodological framework. By making progress in the area of data comparability, the LIS database has achieved one of its main objectives - to facilitate cross-country comparisons of poverty, income distribution and related distributional issues. Such analysis was possible prior to the advent of LIS, but results were always susceptible to criticism on the grounds of non-comparability of data. This had the consequence that the conclusions of individual studies were always questionable (and often **were** questioned) while results from different studies could rarely be compared with any confidence.

The LIS project has managed to reduce these uncertainties by establishing a `lowest common denominator' framework of data consistency which allows a good deal of confidence to be attached to the comparisons which emerge from analyses using the LIS data. By greatly reducing data inconsistencies as an explanation of the observed differences in inequality, LIS has increased the degree of confidence which can be attached to results, and has thus made possible a greater understanding of cross-country differences. It has also opened up a new set of questions focusing on the nature of those differences and why they exist.

One area of income distribution analysis of increasing interest and policy relevance concerns the contribution of the earnings of a second earner in families (normally the wife) to the level and distribution of family earnings and income. Recent studies for a range of countries suggest that the earnings of wives has had, and continues to have, an equalising effect on the distribution of family income, including in Australia (Saunders, 1993), the Netherlands (Nelissen, 1990), Sweden (Björklund, 1992) the United Kingdom (Machin and Waldfogel, 1994) and the United States (Danziger, 1980; Cancian, Danziger and Gottschalk, 1993). However, several of these studies reveal that the distributional impact of wives' earnings is not stable over time, while the LIS-based study by Cancian and Schoeni (1992) reveals that it is also not stable across countries.

This evidence raises questions about the extent to which the observed cross-country differences in the distribution of income among families or households reflect differences in the labour force participation and earnings of married women in each country. The counterpart to the increased market earnings of married women is a decline in either the number of hours of domestic production worked in the home or in leisure. The resulting changes in the value of

home production and leisure act to offset the increase in money income, so that the change in the economic welfare of the family is overstated by the change in money income alone.

Furthermore, the degree of such overstatement is likely to vary across families within and between countries, thus affecting the interpretation of national and cross-national differences in the distribution of (money) income. Such considerations in turn raise issues about the extent to which public policies (e.g., tax and transfer systems and child care provisions and costs) influence the labour force decisions of second earners (whether by intent or not) and about the implications of the rise of the two-earner couple for the design of such policies.

The empirical results presented here are intended to indicate the contribution that LIS data can make to understanding this aspect of cross-country differences in the distribution of income. The details of our methodology and our results themselves are, at this stage, preliminary. They are primarily intended to illustrate one particular approach to this issue, and to give initial estimates of its empirical consequences.

Central to the topic we address is the question of how best to estimate the impact of the value of household production on the distribution of welfare. This question has received considerable attention in many countries, and at many different levels. Some have seen it as important in providing alternative aggregate measures of economic product to those derived from the National Accounts. A good example of this approach is provided by the recent study of unpaid work undertaken by the Australian Bureau of Statistics (ABS, 1994). Using a range of alternative methods, the ABS estimates that, in 1992, the value of unpaid work (including domestic work and the value of volunteer and community work) lies in the range from $206 billion to $272 billion - equivalent to between 52 per cent and 67 per cent of gross domestic product in 1992 (ABS, 1994, Table A).[1]

Our aim in this paper is to focus attention at a more microeconomic level on the consequences of the value of household production for the level of economic well-being within the household and for its distribution between households. The approach we use to estimate the value of household production is based on the concept of earnings capacity applied in this context by Garfinkel and Haveman (1977) and Haveman and Buron (1993). Although this concept has sometimes been referred to as extended income or full income (Becker, 1965), we prefer to

[1] The differences in these estimates reflect differences in the method used to estimate the value of unpaid work and in the wage rate at which hours of unpaid work were valued. Further details are provided in ABS (1990; 1994).

use the term earnings capacity, leaving the term full income to refer to the sum of cash income, household production **and** estimated noncash income in the form of subsidised provision of government services in education, health, housing, and so on (Smeeding et al., 1993).

Hence, full income adds noncash subsidies to earnings capacity. The term extended income (Jenkins and O'Leary, 1994) is used in a more general sense when time-use data are utilised to impute a value to household production using either earnings forgone (as with earnings capacity) or alternative values of home production time (e.g., replacement cost). No one has as yet gone so far as to combine all three components: cash, home production, and noncash subsidies to measure full income in its broadest meaning.

The earnings capacity approach involves replacing actual earnings (whether positive or zero) by an estimate of full-time earnings capacity derived from estimates of conventional human capital earnings functions. While our version of the method is only rudimentary and subject to a number of limitations, the approach has the advantage that it does not require detailed time-use data as used in more sophisticated approaches to estimating the value of home production (e.g. Jenkins and O'Leary, 1994). This means that we can apply the method relatively easily using the existing LIS database and investigate its distributional consequences in a comparative context.

The paper is organised as follows: in Section 2 we review recent developments in non-participation in the labour market and in female labour supply (particularly among married women) and assess their distributional consequences within and between nations. Section 3 considers some of the relevant literature and reviews the conceptual and practical issues involved in estimated earnings capacity. The range of potential distributional consequences of substituting actual earnings by earnings capacity is also discussed, and the extent and impact of public policies on labour supply behaviour (and hence individual and family earnings) are briefly reviewed. In Section 4, we explain how and why our sample (of countries and, within countries, of families) was selected and outline our methodology in a little more detail, focusing on aspects where conceptual elegance had to be sacrificed on the twin altars of comparative research: practicality and data availability. Our main results are presented, analysed and discussed in Section 5, while our (tentative) main conclusions are summarised in Section 6.

2 Spouses' Labour Supply, Market Earnings and Income Distribution

Most OECD countries experienced the same broad trends in employment and labour force participation during the 1980s. For males, the overall participation rate remained fairly stable or declined slightly, although many countries experienced more substantial declines in participation among males in late middle-age (aged 55 and over). At the same time, as Table 1 shows, for the countries included in this study, female participation rates rose significantly and the percentage of females in the labour force who were married also rose (OECD, 1992) suggesting an even greater rise in participation among this group.

These changes saw the `two-earner couple' increase in significance, to the point where it became more common than the single-earner couple in a number of countries. For those in employment, the rate of part-time employment has traditionally been much higher for females than for males and even though part-time employment among males has risen, females still occupy the bulk of all part-time jobs (Table 2). Within these broadly similar trends there is, however, a considerable diversity of experience within individual countries, as is apparent from Tables 1 and 2.

Table 1: Participation Rates by Gender, 1980-90 (Percentages)

	Males			Females		
	1980	1985	1990	1980	1985	1990
Australia	87.6	85.0	85.7	85.5	54.1	61.9
Canada	87.6	86.2	86.3	57.9	63.5	69.0
Germany	84.3	82.3	84.4[(a)]	52.8	52.9	56.9[(a)]
Netherlands	78.3	75.8	80.0	36.3	41.0	53.1
United States	87.8	87.1	87.6	61.3	65.5	69.6

Note: a) 1989

Source: *OECD Labour Force Statistics, 1970-1990, Part III.*

Table 2: Part-time Employment, 1990 (Percentages)

	Part-time employment as a Percentage of total employment			Female part-time employment as a percentage of total part-time employment
	Males	Females	Total	
Australia	8.0	40.1	21.3	78.1
Canada	8.1	24.4	15.4	71.0
Germany	2.6	33.8	15.2	89.7
Netherlands	15.8	61.7	33.2	70.4
United States	10.0	25.2	16.9	67.6

Source: *OECD Employment Outlook*, July 1993, Table D.

There are also significant cross-country differences in the incidence of non-employment due to either unemployment or inactivity (non-participation in the formal labour market). There is also a strongly gendered pattern to these differences. Table 3 indicates that even among those of prime workforce age (25 to 54 years), around an eighth of all men and between a third and a half of all women were non-employed, on average, over the 1980s. Over the decade, higher unemployment saw the rate of non-employment among males rise (except in the Netherlands), while increased participation caused the opposite trend for women (OECD, 1994, Table 17). Again, these broadly similar trends conceal substantial differences in the experience of individual countries.

Table 3. Non-employment Rates, by Age and Gender (Percentages)

	Males aged			Females aged		
Country/Year	15-24	25-54	55-64	15-24	25-54	55-64
Australia (1980-91)						
Inactivity	26.0	6.6	63.9	35.0	40.8	89.4
Unemployed	10.5	4.9	1.9	8.8	3.4	0.3
Total	36.6	11.4	65.9	43.8	44.2	89.7
Canada (1980-91)						
Inactivity	29.1	6.2	30.5	35.2	31.0	65.7
Unemployed	11.7	7.0	4.7	8.6	5.8	2.3
Total	40.8	13.2	35.3	43.8	36.9	68.0
Germany (1980-89)						
Inactivity	37.6	6.1	37.9	43.3	40.5	74.1
Unemployed	4.8	5.0	5.4	5.1	4.3	2.6
Total	42.4	11.0	43.3	48.3	44.9	76.7
Netherlands (1987-89)						
Inactivity	38.4	6.6	54.2	40.7	43.1	84.1
Unemployed	7.0	4.9	1.6	8.1	6.3	0.7
Total	45.4	11.5	55.8	48.8	49.4	84.8
United States (1980-91)						
Inactivity	27.0	7.0	32.1	36.9	30.3	57.5
Unemployed	9.7	5.1	2.9	8.0	4.0	1.6
Total	36.7	12.1	35.0	44.9	34.3	59.0

Source: OECD, 1994, Table 17.

Since these differences are unlikely to have neutral consequences for measures of income distribution, they assume particular significance in the context of cross-country distributional comparisons. Two specific concerns can be identified. The first relates to the effects of different national labour market configurations on cross-country comparisons of inequality at a point in time, and the second to the effects of changing labour market trends on comparisons of income distribution and inequality within individual countries over time. Both the prevailing patterns and the way they are changing vary between countries, which means that comparisons of inequality at a point in time and over time will both be

affected. Unless an attempt is made to control for these differences, it will not be possible to gauge the extent to which they contribute to the observed differences in inequality.

The degree to which one of these factors can influence cross-national comparisons of income distribution is illustrated in Figure 1, which compares two measures of income inequality among families with the female labour force participation rate.[2] Although no clearly discernible pattern emerges from these data, there is a tendency for income inequality to be lower in those countries (Finland, Norway, Sweden) where female participation rates are highest, compared with countries like Ireland and Italy which are characterised by low female participation and relatively high inequality. Several countries do not conform to this general pattern, however, notably the United States and the Benelux countries, which lie above and below it, respectively. There is also no clear pattern among those countries where the female participation rate varies in the middle range, i.e., from between 55 per cent and 65 per cent. Nevertheless, Figure 1 provides at least some circumstantial evidence to suggest that cross-country female participation rate variations are one factor underlying cross-country differences in the distribution of income between families.[3]

One way of overcoming the complications to which this gives rise is to compare not the actual distributions of family income, but an estimate of what those distributions would be if each country had the **same** female participation rate. This approach has been employed to estimate the distributional impact of female earnings on family income inequality in the national studies cited earlier, as well as in the cross-country study using the LIS database by Cancian and Schoeni (1992).[4] The approach used in these studies involves comparing the actual distribution of income with the `zero earnings counterfactual' in which the earnings of all wives are set to zero. Comparison of the two distributions then forms the basis for estimating the distributional impact of the earnings of married women.

Table 4 applies the `zero earnings counterfactual' method using mid-1980s' LIS

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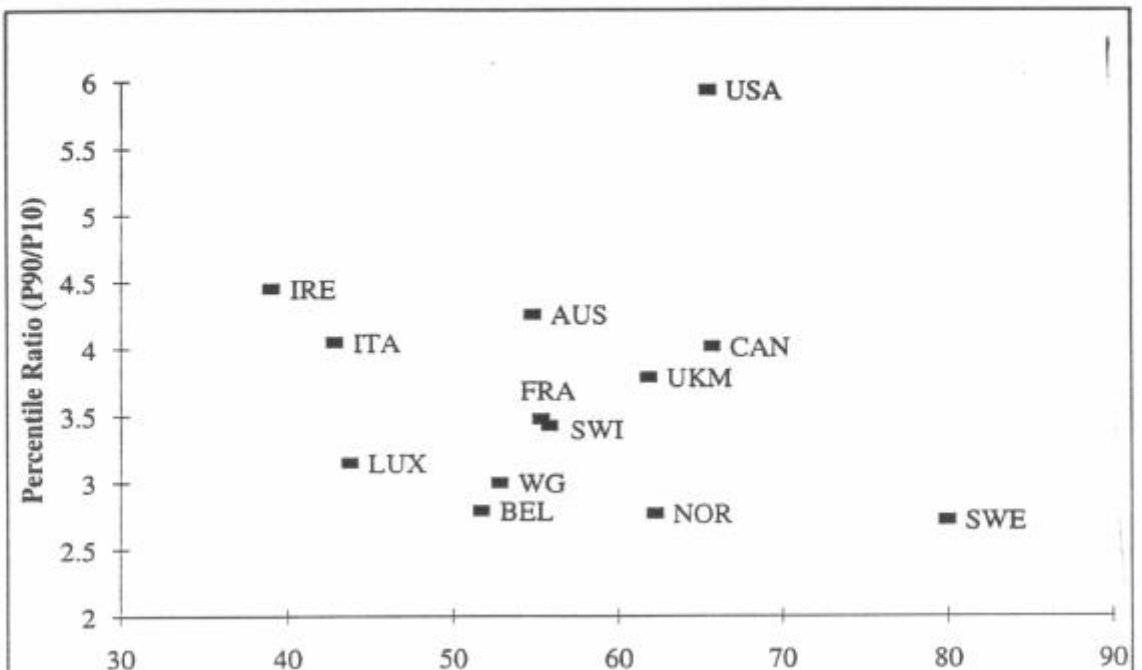
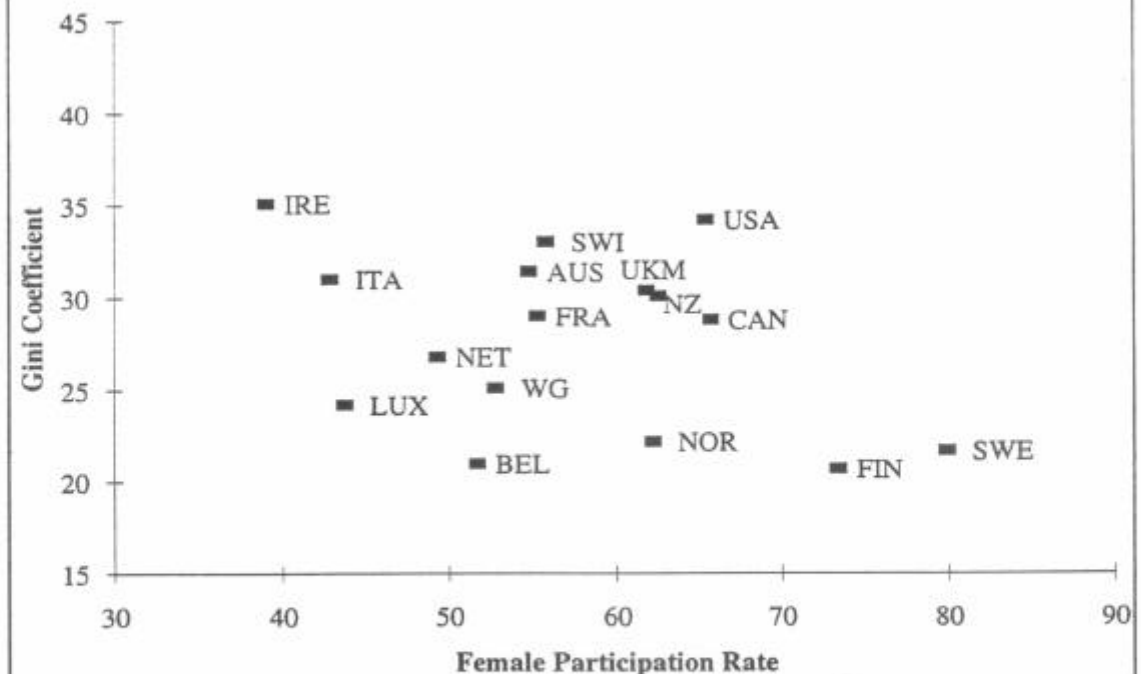
[2] The inequality measures have been derived from the second wave of LIS data by Atkinson, Rainwater and Smeeding and are not yet ready for quotation. They refer to the (person-weighted) distribution of equivalent household disposable income. (Atkinson, Rainwater and Smeeding, forthcoming). The female participation rates refer to the same year as the LIS data and are taken from *OECD Labour Force Statistics*, 1970-1990 (OECD, 1992).

[3] Slottje, Hayes and Shackett (1922) provide evidence of a significant negative impact of female (and male) labor force participation on inequality of family income across states in the United States.

[4] The countries included in the study by Cancian and Schoeni are: Australia*, Canada*, France, (West) Germany*, Israel, Netherlands*, Norway, Sweden*, United Kingdom and the United States*. Only those marked with an asterisk had data from the mid-1980s available at the time that the paper was written.

Figure 1: Cross-national Relationships Between Income Distribution and Female Labour Force Participation





Source: Luxembourg Income Study database and *OECD Labour Force Statistics.*

data for the five countries studied here: Australia, Canada, (West) Germany, the Netherlands, and the United States.[5] The upper panel of Table 4 compares the distribution of the annual earnings of the male partner in all couples aged 25 to 55 years with the distribution of the combined earnings of both partners. In all five countries, the distribution of the combined earnings of both partners Lorenz-dominates the distribution of the earnings of the head, although the extent of the decline in inequality (measured by the percentage reduction in the Gini coefficient) varies considerably, from less than two per cent in Australia to almost 14 per cent in the United States.

These comparisons also highlight the extent of cross-country differences in the distribution of earnings itself, a topic which has received considerable attention in several recent studies using the LIS data (Green, Coder and Ryscavage, 1992; Bradbury, 1993; Fritzell, 1993; Gottschalk, 1993; Jänti, 1993) as well as in an OECD study using national labour force data (OECD, 1993). Table 4 indicates that the earnings distributions in even this small range of countries vary considerably. This is illustrated by noting that, aside from the lowest two deciles, the distribution of family earnings in the United States is less equal than the distribution of the earnings of the male partner alone in Germany and the Netherlands - despite the equalising impact of the earnings of American wives.

The lower panel of Table 4 broadens the analysis by comparing the distribution of (unadjusted) gross family income (GFI) with the `zero earnings counterfactual' in which the earnings of all wives are set to zero and GFI re-calculated. This again indicates that married women's earnings cause a reduction in inequality among couples. The patterns within and between countries are similar to those based on the distribution of earnings just discussed. Again, the United States stands out as having the greatest degree of inequality. In this case, the zero earnings counterfactual distributions in all four other countries Lorenz-dominate the actual distribution of gross family income in the United States. Again, therefore, we see that while the distributional impact of female earnings on family income inequality is significant within countries, there are other factors which play a more important role in explaining distributional differences between countries.[6]

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[5] All subsequent discussion and results refer only to these five countries, and to the specific age group included in Table 4, as they are the primary focus of this paper.

[6] The comparisons in Table 4 are simplistic because they take no account of behavioral response in the labour market (and hence earnings) of the head and the spouse, nor (in relation to the lower panel) of how changes in the earnings of either partner influence other components of gross family income (e.g., government cash transfers).

Table 4: Zero Earnings Counterfactual Comparisons of Earnings and Income Distributions Among Prime-Aged Couples (Decile Shares)

	United States (1987)		Canada (1987)		Australia (1986)		Netherlands (1987)		Germany (1984)	
Decile	Earnings of the head	Earnings of head and spouse	Earnings of the head	Earnings of head and spouse	Earnings of the head	Earnings of head and spouse	Earnings of the head	Earnings of head and spouse	Earnings of the head	Earnings of head and spouse
First	0.0	0.6	0.0	0.7	0.0	0.0	0.0	0.4	0.0	1.1
Second	1.5	3.6	1.6	3.7	0.1	1.8	3.7	5.6	4.3	5.6
Third	4.8	5.7	5.2	6.0	4.8	5.9	7.4	6.8	7.5	6.8
Fourth	6.9	7.2	7.5	7.5	8.4	7.8	8.3	7.7	8.5	7.8
Fifth	8.4	8.5	9.1	8.9	9.8	9.3	9.2	8.7	9.3	8.8
Sixth	10.0	9.8	10.6	10.2	11.1	10.7	10.1	9.8	10.1	10.0
Seventh	11.8	11.5	12.2	11.7	12.5	12.1	11.2	11.3	11.1	11.4
Eighth	13.8	13.3	13.9	13.3	14.0	13.7	12.7	13.0	12.8	13.0
Ninth	16.5	16.0	16.2	15.6	16.1	16.1	15.1	15.1	15.3	15.0
Tenth	26.3	23.9	23.7	22.4	23.2	22.5	22.4	21.7	21.2	20.5
Gini coefficient	0.413	0.356	0.382	0.335	0.369	0.362	0.323	0.306	0.310	0.289
Percentage change in Gini		13.8%		12.3%		1.9%		5.3%		6.8%
Decile	Gross family income (GFI)	GFI minus earnings of spouse	Gross family income (GFI)	GFI minus earnings of spouse	Gross family income (GFI)	GFI minus earnings of spouse	Gross family income (GFI)	GFI minus earnings of spouse	Gross family income (GFI)	GFI GFI minus earnings of spouse
First	2.6	1.9	3.0	2.5	2.8	2.4	4.2	3.5	4.5	3.4
Second	4.7	4.2	5.3	4.8	5.2	5.3	5.7	6.0	5.8	6.0
Third	6.0	5.6	6.6	6.2	6.5	6.6	6.6	6.8	6.8	6.8
Fourth	7.1	6.8	7.7	7.5	7.6	7.5	7.4	7.5	7.7	7.5
Fifth	8.2	8.0	8.6	8.6	8.5	8.3	8.2	8.2	8.6	8.4
Sixth	9.4	9.7	9.7	9.7	9.5	9.4	9.3	9.1	9.6	9.3
Seventh	10.8	10.7	11.0	10.9	10.8	10.4	10.5	10.2	10.6	10.5
Eighth	12.6	12.5	12.4	12.4	12.2	11.9	11.9	11.7	11.9	12.0
Ninth	15.4	15.6	14.5	14.7	14.3	14.2	14.1	14.1	14.1	13.9
Tenth	23.1	25.6	21.1	22.6	22.5	24.1	22.1	23.0	20.4	22.0
Gini coefficient	0.311	0.346	0.273	0.298	0.287	0.301	0.262	0.274	0.243	0.266
Percentage change in Gini		11.3%		9.2%		4.9%		4.6%		9.5%

Source: LIS database.

The comparisons presented in Table 4 highlight the effect of variations in the earnings of married women, but in a way which is, at best, rudimentary and mechanical. Any analytical advantage that they bestow is probably more than outweighed by the reduced relevance of assuming female labour supply is reduced to zero (with no induced behavioural adjustments). The approach is also flawed because it constrains all married women to leave the labour force simultaneously, yet takes no account of how the associated increase in home production and leisure affect the level and distribution of economic welfare among couples. In addition, no account is taken of variations in the participation and employment rates of males which, as Tables 1, 2 and 3 indicate, also differ across countries, nor of the effect of massive labour force change on levels of unemployment, wages, prices, and other macroeconomic variables.

These observations suggest that while the zero earnings counterfactual approach reduces some of the cross-national variations in labour market behaviour, it does so by artificially holding these constant at the wrong level. In the remainder of this paper, we explore the implications of holding such variations constant, not at zero, but at the level corresponding to the full utilisation of existing labour skills and potentialities represented by our estimates of earnings capacity.

Before moving on to consider the earnings capacity approach in more detail, it is worth emphasising that although the results in Table 4 are consistent with the other studies cited earlier in that they show married women's earnings to have an equalising effect on income distribution, there can be no presumption that this will always be the case (Cancian, Danziger and Gottschalk, 1993). Neither can it be assumed that evidence of past equalising effects in some countries will necessarily continue into the future, or be replicated in other countries. It is possible, for example, as noted by Saunders (1993), that the size of the equalising impact could decline over time, leading to a disequalising effect in relation to the change in inequality over that period. Finally, it is important to emphasise that this entire discussion focuses only on income and ignores the welfare consequences of the value of home production and leisure which are forgone in order to participate in the labour market and receive monetary earnings. This latter issue is taken up in the next section.

3 Earnings Capacity and the Distribution of Welfare

The Measurement and Impact of Earnings Capacity

The limitations of using market income (even when adjusted for need using an equivalence scale) to measure economic welfare are well known. These include the fact that market income reflects tastes and preferences for leisure as compared with work, and that survey-based measures of market income contain transitory elements which cannot be separated from permanent income. In addition, money income only reflects the financial return to labour supplied to the market economy and thus takes no account of the value of work undertaken in the domestic economy, the value of home production.

For these reasons, comparisons of the monetary incomes of different families at a point in time, or of the income of a given family at different points in time, are likely to provide misleading indications of the relative level (and hence the distribution) of economic welfare and how this is changing over time. Gottschalk and Meyer (1994) have recently noted, for example, that the increased incomes of many families in the United States reflect the increased labour force participation of married women, yet associated with this rise in money income is a fall in the value of household production (and/or leisure). This argument, which applies equally to most other industrial countries, means that the change in money income overstates the gain in economic welfare.

Taking account of changes in the value of home production thus has the potential to cause prevailing views on the size and trend in inequality to be re-considered, particularly when these reflect increased female labour supply, as they clearly do to a considerable extent. The complexities this introduces for evaluating the change in inequality within a single country are compounded when the focus shifts to comparing inequality between countries, particularly where the level and structure of female labour force participation varies. The available evidence on time-use indicates that patterns of household work vary in several key dimensions, including within families according to the labour force status of both parents (ABS, 1994; Flood and Klevmarken, 1992, Figure 4), between countries (Flood and Klevmarken, 1992, Table 1), and over time within countries (Gershuny and Robinson, 1988). Taking account of how these changes in the value of home production affect living standards and the various dimensions of inequality is thus an important task.

This requires, as a first step, that the value of home production can be estimated with some degree of accuracy. Two approaches have been developed for this

purpose: the service price (or **replacement cost**) method in which domestic work is valued at the market price of the equivalent services performed in the domestic economy; and the **opportunity cost** method in which the potential market wage is used to value hours worked in the domestic economy. Several variants exist within each approach, each of which embody different assumptions and have different data requirements.[7]

Detailed discussions of the merits of these alternative methods by Chadeau (1992) and Goldschmidt-Clermont (1993) agree on at least one point, which is that the opportunity cost method produces estimates which are inconsistent with the National Accounts framework. As Chadeau puts it:

> ....the `opportunity cost of time' method.... is not very plausible as it imputes different values to identical services depending on who produces them. In addition, it values services produced in the household at the cost of producing quite different goods or services on the market. (Chadeau, 1992: 101)

Despite these criticisms, the opportunity cost method has been used extensively in micro-studies of living standards and inequality, under the guise of the estimation of earnings capacity. Moreover, from a micro-behavioural maximisation perspective, the opportunity cost approach is appealing precisely **because** of the difference between opportunity cost and replacement cost. When women can work in the market, use the earnings they receive to purchase replacement services (housework, prepared meals, child care, etc.), cover work-related costs (transportation, clothing, etc.) **and still** have extra money income left over, the household may, in fact, achieve a higher overall level of well-being from having more than one adult in market-based employment.[8]

The earnings capacity method involves identifying the factors which determine the earnings of those who are in paid employment and using the resulting model to predict the forgone earnings of those who are not in paid employment. These earnings capacity estimates can then be used to replace the actual earnings of those actually in employment (including those who may not be working to their full capacity) and to impute earnings for those not actually receiving market earnings.

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[7] These alternative valuation methods are explained and compared in the two ABS reports referred to earlier (ABS, 1990; 1994). Both reports also contain a range of international comparisons of the estimated value of unpaid household work.

[8] It might be argued that the true addition to household well-being is, in fact, only the difference between opportunity cost and replacement cost. Most measures of earnings capacity fail to adjust for the extra costs of market workers and hence, overstate the gain in net economic well-being.

Ideally, the method is used to estimate the hourly wage, from which the value of home production can be calculated given information on the time spent performing household tasks. Where such information is not available (as is the case with the LIS database) weekly or annual earnings capacity can be calculated from data on the earnings of full-year, full-time workers. The value of home production can then be estimated as being equal to the earnings capacity of those who are not participating in the labour market. This is the income that these people could earn if they were participating in the labour market, but it must be recognised as an imprecise estimate of the value of home production because it takes no account of how much time is **actually** spent on household work while they are not participating in the labour market.

Conceptually, the earnings capacity approach can be criticised because it assumes that those not in the labour force are free to choose to work to their maximum capacity in the labour market if they wish and that they face no constraints which prevent them from receiving their potential wage, even if they all did so simultaneously.[9] Also, the method takes no account of the costs of joining the labour market. Where these are substantial (particularly where the second partner joins and where there are young children in the household), the replacement cost of forgone household services might exceed the net earnings capacity of the household worker, thus resulting in the finding that market work reduces household well-being, everything else being equal. Finally, the effects of massive increases in labour market participation by all those part-time workers currently working at less than full capacity might have a serious indirect impact on wages, jobs, and levels of pay, yet no account is taken of these.

These limitations of the earnings capacity approach are acknowledged and should be kept in mind when reviewing our results. Our main response to them is not to downplay their significance, but rather to argue that there is still considerable merit in exploring the implications of the method, particularly in a comparative context. The alternative, after all, is to assume in effect that the imputed market wage (as well as the value of all non-market activities) for those underemployed, unemployed or not in the labour force, is zero.

What does previous research tell us about the difference that the use of earnings capacity makes to conventional estimates of inequality based on observed earnings (or income)? In their original study, Garfinkel and Haveman (1977) found that in

[9] Garfinkel and Haveman (1977) also note that the estimates of earnings capacity for those with low labour force participation are likely to be over-estimated relative to those with high participation rates because of tastes, labour market scarring effects and other self-selection biases.

the United States, the distribution of the combined earnings capacity of the head and spouse (gross or net of child care costs) was virtually identical to the distribution of gross family income, but was more equal than the distribution of pre-transfer income for the whole population. For the non-aged population, however, gross earnings capacity was distributed more equally than either gross family income or pre-transfer income.

In both cases, the Gini coefficient for the (gross) earnings capacity distribution was about 82 per cent of that for pre-transfer income, leading to the conclusion that around 18 per cent of the observed variation in pre-transfer income resulted from variations in the utilisation of earnings capacity. More recently, Gottschalk and Meyer (1994) have found that using the earnings capacity approach to estimate the value of home production causes a reduction in both the level and the post-1976 increase in inequality in the United States. Furthermore, these conclusions are not affected by the method used to estimate the value of home production (replacement cost or opportunity cost), nor by whether income is adjusted using an equivalence scale or not.

The Role of Public Policies

It has already been noted that one advantage of the use of earnings capacity rather than actual money income as a proxy for economic welfare is that the former, unlike the latter, abstracts from the effects of tastes and preferences which influence decisions about labour market participation. Of course, while tastes for work or for having children play an important role in labour market choices, such decisions also reflect constraints, as well as the market incentive and disincentive structures and the ways in which these are moderated or exacerbated by public policies.

The range of public policies of relevance in this context is very broad, including any interventions which influence the supply or demand for labour, or the structure of earnings (directly or indirectly).[10] Tax policies, for example, will influence labour supply decisions at the margin (hours of work) or in total (the participation decision), particularly the tax treatment of husbands and wives. Where there is some form of joint taxation, the incentive for both partners in a couple to join the

[10] The role these factors play in influencing married women's labor force participation decisions is explored (using the LIS database) by Wolff (1990).

labour force may be less than where tax is levied on an individual basis.[11] One might, on this basis, thus expect fewer married women to be in the labour force in countries with joint taxation, in which case the earnings capacity adjustments have the potential to have a bigger impact in these countries.

Another range of policy instruments likely to be important concern the ways in which eligibility and entitlement for social security cash transfers are defined and structured. Where, as in the case of Australia for example, benefits are means-tested and paid on a family unit basis, the incentive for the wife of an unemployed man (or of a part-time male worker receiving a means-tested social benefit) to seek work will be less than in a system such as the United States, where benefits are earnings-related and determined on an individual basis. The level of social benefits paid in respect of children and whether they are paid on a universal or means-tested basis are also likely to influence the labour supply behaviour of at least one parent, possibly both parents. The nature, extent and cost of child care provisions will also affect the labour supply decisions of women with younger children, because child care provisions facilitate labour force participation, but also and because they lower the financial costs of joining the workforce. Finally, some nations (e.g., Germany, Luxembourg, Netherlands) have entire institutional structures including limits on shopping hours, higher pay levels for married men, and direct subsidies for non-working spouses which are likely to impact on the labour market behaviour of married couples.

In addition to these more obvious and direct mechanisms, workforce decisions will be influenced by a range of other factors which are likely to vary from country to country.[12] Attitudes to the role of women in society are changing, but at different speeds in different places and from differing starting points. On the demand side, the structure of employment opportunities, combined with the level and pattern of spending on education, will influence the wage structure and hence affect earnings capacity. The extent of non-wage labour costs will also affect the pattern of labour demand, while employment-related provisions like vacation, sickness and parental leave and so on will influence the attractiveness of work and affect choices made about the balance between work and family responsibility.

The range of such indirect effects is potentially enormous, as are their consequences for the level and distribution of earnings capacity. In a comparative context in which different countries follow different policy regimes and pursue different goals, there is little likelihood that the balance of forces affecting earnings

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[11] Income tax operates on an individual basis in Australia, Canada and (since 1973) the Netherlands, while the United States has joint taxation and Germany an optional (income-splitting) system (OECD, 1991).

[12] For a more detailed discussion of these issues, see Hewitt (1993).

capacity will even-out to anything like the same extent in different countries.

Discussion of some of the more directly relevant policies in place in the five countries studied here is thus useful in providing a background to our results. We do not undertake any formal or systematic attempt to link the differences in our results to the policy differences which may have caused them. Such an exercise is far beyond the scope of this paper. Rather, in describing some of the policy differences in our sample of countries, we hope to provide a policy context which will assist with the understanding and interpretation of our findings.

The Family Policy Climate in Australia, Germany, the Netherlands and the United States

It is an extremely difficult task to encapsulate all of the relevant policy differences in a single or small number of indicators. Rather than attempt this, we have relied upon recent research which investigates how tax and benefit programs in a range of OECD countries (including all of those studied here except Canada) implicitly recognize the value of wifely labour (Shaver and Bradshaw, 1993; forthcoming). These comparisons have a bearing on the cross-country pattern of incentives encouraging married women to join the labour force or remain in the home, and are thus relevant to how the pattern of earnings capacity is likely to differ from that of actual earnings in each country studied.

The estimates presented by Shaver and Bradshaw (forthcoming) are derived from a broader comparative study of support for children undertaken by Bradshaw et al., (1993). That study incorporates a large range of public programs which provide support for families with children at different levels of market earnings, including taxes (central and local government), relevant tax reliefs and concessions, rental subsidies, subsidies for health care, pre-school and school education benefits, income support benefits for families with children and the costs of child care (Bradshaw et al., 1993; chapter 3 and Appendix). The analysis undertaken by Shaver and Bradshaw adopts a narrower approach, focusing on the impact of the income tax system, social security contributions and income-related and non-income related cash benefits for children.

Table 5 brings together some of the results presented in this comparative analysis of the different packages of support for different family types.[13] The results in the first four rows of Table 5 estimate the extent to which the tax-benefit system provides support to `dependent' (non-earning) wives, by comparing the net income

[13] The estimates refer to the situation in each country in May 1992.

of a single person with that of a working man and non-working wife at different income levels. The larger the differences, the greater the system implicitly values a non-working (more accurately, a non-earning) wife. It can be seen that (except at very low incomes) Germany values non-earning wives most highly, followed by the Netherlands and Australia (where the value of the benefit package declines sharply as income rises) and the United States (where the value of the package increases with income). For a couple with one school-age child, the value of benefits for a non-earning wife is still highest (and more so) in Germany, followed by the Netherlands, Australia (now well below the Netherlands because of the relatively low value of Australian cash benefits for children) and, lastly, the United States.

Table 5: Cross-country Comparisons of the Tax-Benefit Package for Different Family Types, May 1992 (Percentages)

	Australia	Germany	Netherlands	United States
Support for a Non-earning wife [a]				
Without Children				
0.5 x AME [b]	10.1	8.3	10.0	5.9
1.0 x AME	4.9	11.9	6.6	3.8
1.5 x AME	3.6	13.9	6.0	8.4
With one school-age child				
1.0 x AME	8.2	17.3	11.5	5.2
Support for an earning Wife [c]				
Without children				
Increase in net earnings: AME plus 0.66 x AFE	50	41	62	42
Increase in gross earnings: AME plus 0.66 x AFE	51	48	53	43
With one preschool child [d]				
Increase in net earnings: AME plus 0.66 x AFE	70	86	60	35

Notes:
a) Percentage difference between the net disposable income of a single person and a one-earner couple at the same gross income level.
b) AME = average male earnings; AFE = average female earnings.
c) Percentage difference between the net disposable incomes of single-earner and dual-earner couples compared to (net or gross) average male earnings.
d) Includes the value of the child benefit package net of child care costs.

Source: Shaver and Bradshaw, forthcoming, Tables 1, 3 and 4.

The lower part of Table 5 estimates in a similar fashion the implied value placed by the tax and benefit system on an earning wife by comparing the gross (and net) earnings of a two-earner couple to that of a single-earner couple on (male) average earnings. The net earnings comparisons show that earning wives are valued most highly in the Netherlands (where net family earnings rise by 62 per cent) and valued least in Germany and the United States (where net earnings rise by around 40 per cent). However, cross-country comparisons of these figures must be interpreted with care, as they reflect differences in the ratio of female to male earnings in each country, in addition to any differences arising from the tax-benefit package itself.[14]

To overcome this, the estimates in the sixth row of Table 5 are derived from calculations of the changes in gross family income which occur when the wife becomes an earner. This has the effect of increasing the German figure, decreasing the Netherlands figure but leaving the other two much the same. The impact of differential relative earnings can now be avoided by comparing the net and gross earnings estimates in rows five and six. This indicates that in Australia and the United States, where the net and gross figures are the same, the system is neutral in its treatment of earning wives (relative to the treatment of the husband's earnings). In Germany, the system treats the earnings of the wife more harshly than those of the husband, while the reverse is true in the Netherlands.[15] The final row of Table 5 repeats the net earnings calculations for a couple with a preschool age child in child care. These figures include an estimate of the cost of child care in each country. They show the percentage of the net earnings of the wife which is left after adding in the value of the child benefit package and deducting child care costs. Germany now ranks first, well ahead of Australia and the Netherlands, with the United States again least generous.

Summary

As a prologue to our methodological and empirical work, we have attempted to sketch out the theoretical and institutional forces which come into play when estimating a value for household production (or leisure) of adults, primarily married

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[14] According to Bradshaw et al. (1993, Table 3.2) the ratio of average female earnings to average male earnings in 1992 was 78 per cent in Australia, 70 per cent in Germany, 75 per cent in the Netherlands and 66 per cent in the United States. These differences are interesting in themselves, and it is worth noting that there is less justification for abstracting from them in the current context, where the focus is on comparing the structure of the incentives to participate in the labor market than on comparing the relative value of the child benefit package in different countries. Some countries have introduced mandatory limits on gender earnings relativities precisely so as to influence labor market incentives (as well as for equity reasons).

[15] This result for the Netherlands is somewhat surprising in light of the low participation rate of women generally in that country (see Table 1), a point also noted by Shaver and Bradshaw.

women, using an earnings capacity framework. Clearly, differences in tastes and preferences, cultural differences and a range of public policy differences will affect the financial dimensions which influence the choice of working in the market versus working in the home in each nation.

The nations that we have decided to study here are typical of the wide range of perspectives found in modern nations. While there is a clear trend toward increased labour force participation by married women in every nation studied, these differences reflect changes in the balance of forces within every (potential) multiple-earner household and every nation. Several sets of these forces and issues present us with a wide range of choices concerning the methods and techniques which could be employed to carry out the estimation of earnings capacity. We now, in a much more modest and tentative version, turn to the central choices we have made in carrying out this exploration.

4 Methodology and Sample Selection

Methodology

Having provided a justification for our use of the earnings capacity approach, we now describe in a little more detail how we have applied the method. We have been guided in this exercise by the initial methodology developed by Garfinkel and Haveman (1977) and its recent application by Haveman and Buron (1993). Central to the method is the application of the human capital model to estimate an earnings function in which the level of earnings is assumed to be a function of a vector of human capital variables ($h_1 \ldots\ldots h_m$), a vector of personal characteristics variables ($p_1 \ldots\ldots p_n$), and a vector of job characteristics variables ($c_1 \ldots\ldots c_k$). Thus:

$$\log(e) = f(h_1 \ldots\ldots h_m ; p_1 \ldots\ldots p_n ; c_1 \ldots\ldots c_k) \qquad (1)$$

where $\log(e)$ is the logarithm of annual gross wage and salary income.

We excluded earnings from self-employment because of the conceptual problems of separating this into a return to labour and a return to capital, as well as the practical limitations on the accuracy of household income survey data on self-employment incomes (Atkinson and Micklewright, 1983; Smeeding and

Schmaus, 1990; Atkinson, Rainwater and Smeeding, forthcoming).[16]

We estimated the earnings function (1) from a sample which included all full-year, full-time (FYFT) workers, single people as well as those in couple families. As noted earlier, the LIS database does not make it generally possible to derive estimates of the hourly wage rate, so we were forced to use total (annual) wage and salary income. However, we decided to focus on FYFT workers only so as to minimise the effect of variations in hours worked. We included single people (aged 25 to 55) as well as couples in this age range, in order to obtain better point estimates of the parameters of the earnings function.

Once estimated, the parameters of equation (1) were used to predict the earnings capacity (e^*) of each individual in our sample of couple families (described below) given data on their human capital, personal and other relevant characteristics. These estimates of earnings capacity then replaced the actual earnings (whether positive or zero) of **all** partners in our sample of couples and the resulting distribution was compared with that of actual earnings.

This latter step in the exercise was undertaken in a series of separate stages. First, we estimated the earnings capacity of FYFT workers only, then we extended the exercise in several sequenced steps to include, at each successive stage, part-time (PT) workers, then those people who were unemployed (UN) and, finally, those who were not in the labour force (NILF).[17] At each stage in this sequence, the actual earnings of each individual in each group was replaced by the estimate of earnings capacity, the implied distribution of earnings capacity was derived and the degree of inequality calculated.[18] At the stage of estimating these various distributions, the unit of analysis was changed from the individual to the family (in our case couple families only; see below). This is partly because the family is a more appropriate unit of analysis for distributional purposes, and partly because we

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[16] We included the self-employed themselves in our sample, a procedure which, because of the exclusion of income from self-employment, meant that our samples contained a large number of cases of zero wage and salary incomes, even among FYFT workers, i.e., those who were self-employed. The percentages of family heads with zero reported wage and salary income were: Australia (18.8 per cent), Canada (13.8 per cent), Germany (10.0 per cent), Netherlands (8.1 per cent) and the United States (12.5 per cent). The treatment of low or zero incomes for the self-employed in the LIS database is discussed by Green, Coder and Ryscavage (1992).

[17] It was possible to identify fairly precisely FYFT workers on the LIS data tapes. Part-time (PT) workers were defined to include all other individuals with positive wage and salary income over the year and thus include those defined as part-time in terms of either hours worked per week or weeks worked per year. The unemployed (UN) and those not in the labor force (NILF) were identified as those individuals with zero **annual** wage and salary income whose **current** status (i.e., at the time of the survey) was unemployed or not in the labor force, respectively. Appendix Table A1 presents the derivation of the labor force variables in each country.

[18] This sequenced analysis of inequality is similar to that recently undertaken by Gottschalk (1993).

wish to investigate the impact of differences in individual earnings (and earnings capacity) on inequality between families.

To summarise, we thus have the following five distributions to estimate and compare:

D1 = the distribution of actual gross annual wage and salary income (hereafter earnings) among prime-aged (25 to 55) couples;

D2 = the distribution of earnings among couples where the actual earnings of all FYFT workers are replaced by their estimated earnings capacity;

D3 = as for D2 with the actual earnings of all PT workers also replaced by their estimated FYFT earnings capacity;

D4 = as for D3 with estimated FYFT earnings capacity included as earnings for the unemployed; and

D5 = as for D4, with the estimated FYFT earnings capacity included as earnings for those not in the labour force.

This structure allows us to estimate the overall distributional impact of replacing actual earnings by earnings capacity as we move sequentially from those with strongest attachment to the labour force to those with weaker or no such attachment.

One of the problems with comparing the distributions of observed earnings and earnings capacity is that the latter is derived from an estimated model which leaves a good deal of the actual variation in earnings unexplained. Unless some account is taken of this, it is difficult to ascribe the differences which emerge in the two distributions to differences in labour force participation behaviour (which cause actual earnings to be below earnings capacity) as compared with differences which are a consequence of the weak predictive performance of the model used to predict earnings capacity.

This explains why, in the first stage of our sequenced analysis described above, we replace actual earnings by earnings capacity for our sample of FYFT workers. This stage provides an indication of the extent to which poor model prediction alone accounts for differences between the levels and distributions of actual earnings and earnings capacity. By then using the latter distribution (D2) as a benchmark against which to compare our subsequent distributions, the impact of the accuracy of the regression predictions on the distributional differences is

minimised (though admittedly not avoided all together).

One final adjustment to the method draws on the analysis of earnings capacity and poverty undertaken by Garfinkel and Haveman (1977) and, more recently, by Haveman and Buron (1993). The latter authors observe that use of the human capital earnings predictions to replace actual earnings omits several important factors known to influence earnings, and note that:

> By adopting this procedure, each individual with the same set of characteristics is assigned the same earnings capacity. Such an assignment procedure, however, neglects the role of unobserved human capital and labour demand characteristics and `luck' in the earnings determination process, and hence leads to an artificially compressed distribution of predicted EC (earnings capacity) for each race-gender group and for the entire population. (Haveman and Buron, 1993: 145)

In order to overcome these problems, we followed the procedure applied by Haveman and Buron. This involves shocking each individual earnings prediction within a cell by a randomised component drawn from a normal distribution with zero mean and standard deviation based on the standard error of the regression equation estimated for all FYFT workers.[19] The results described in Section 5 below have thus all been derived after this randomisation procedure was applied to the actual earnings regression predictions of earnings capacity.

Once the five alternative distributions (D1 to D5) had been derived, the differences between them were compared, both within and across countries. We relied on comparisons of decile mean incomes (more accurately, mean earnings) to get an assessment of the absolute levels of the earnings capacity adjustments at each stage, and on the decile shares, Gini coefficient and percentile ratios in our distributional analysis.[20] It is also worth emphasising that our earnings capacity estimates enter cumulatively as we move from distribution D1 to distribution D5.

One of the issues which motivated this paper was to try and assess, in a comparative cross-country context, the distributional consequences of including an estimate of the value of home production into conventional earnings distribution

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[19] Haveman and Buron note (1993, footnote 7: 145) that there are in fact two components of the earnings residual, one relating to unmeasured individual-specific human capital variables and the other related to random fluctuations in earnings. Following them, we assumed that each component is normally distributed with a zero mean and constant (and independent) variance. The authors would like to thank Larry Buron for his advice and assistance on this aspect of the paper.

[20] In general, the percentile ratio P_i/P_j expresses the ratio of the income level corresponding to the i^{th} percentile of the distribution to that corresponding to the j^{th} percentile of the distribution. The percentile P_{50} is, by definition, equal to the median income level.

comparisons. Our results allow us to approach this through a comparison of distributions D4 and D5, where the latter imputes earnings capacity to those not in the labour force, while the former assumes FYFT earnings capacity earnings for all members of the labour force. The great majority (though not all) of those entered at this last stage of the analysis will be married women currently engaged in domestic (or voluntary) work. However, some domestic work will also have been performed by women (and men) who enter the comparisons at an earlier stage in the chain of comparisons, while some of those who enter at the final stage may not necessarily have been engaged in home production. There is thus something of a difference between what we set out to do and what we actually ended up doing, and this should be kept in mind when interpreting our results.[21]

Sample Selection

The broad structure and features of the LIS database have been described elsewhere (e.g., Smeeding, O'Higgins and Rainwater, 1990) and will not be repeated here. In choosing our sample of countries from the LIS database, we were guided by the objectives of our analysis and restricted by what could be achieved in practice. Because one of our main interests was in investigating the different contributions of the earnings of wives to earnings inequality among families, we restricted our analysis to couple families where earnings were most likely to be the primary source of family income. Thus we included only those couples where both partners were aged between 25 and 55 years and who were not identified as containing at least one partner with a disability which prevented participation in the labour market.[22]

We included couples both with and without children, but did not use an equivalence scale to adjust for differences in need. This was because our emphasis is on comparing alternative distributions of earnings rather than investigating how earnings and other sources of income influence living standards. However, the one study of this type which did use equivalence adjustments found that they did not affect the results (Gottschalk and Meyer, 1994). In our framework, the presence or absence of children is likely to influence labour force behaviour and hence earnings,

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[21] In order to separate out the differences in value due to household production by spouses, we estimated the sum of earnings capacity for the male plus actual wife's earnings as a sub-stage between calculating the distributions D4 and D5. These results show that at least 80 per cent (Canada) and up to 95 per cent (Germany) of the difference between calculating the distributions D4 and D5 is due to married women with no earnings who are not in the labour force.

[22] This focus on those in prime workforce age range accords with recent studies of earnings distribution undertaken by Green, Coder and Ryscavage (1992), Bradbury (1993) and Saunders and Fritzell (1993).

and we attempt to capture such an effect in our earnings model. However, we do not go beyond this to investigate the demands placed on those earnings by the needs arising from the existence of the children themselves.[23] We further restricted ourselves to countries with data available in the `second wave' (circa 1985) of the LIS database and to those countries for whom it was possible to derive comparable estimates of the earnings function. This left us with the following five countries (years in brackets): Australia (1986); Canada (1987); (West) Germany (1984); the Netherlands (1987) and the United States (1986).[24]

Table 6 presents a breakdown of the (unweighted) samples in each country by family type and labour force status. Our sample size ranged from around 1500 couples in Germany to over 4600 in Canada. Comparison of the different national sample structures reveals some substantial differences in the pattern of labour force attachment in each country. In total, between 87 per cent (Canada) and 93 per cent (Australia and Germany) of husbands were in employment, although the prevalence of part-time male employment was more variable, being highest (18.6 per cent) in the United States, but very much lower in Australia (3.3 per cent) and the Netherlands (6.1 per cent), with Canada and Germany in between with a figure of around 12 per cent. Although these estimates are broadly similar to the figures presented earlier in Tables 1, 2 and 3, there are also several notable differences. These arise primarily because the estimates in Table 6 are unweighted, but also because Table 6 is derived from household income surveys (not labour force surveys), because the categories themselves are not defined solely on the basis of current labour force status, and because our figures refer to prime-aged couples only, not to the total labour force.

Not surprisingly, cross-country variations in employment rates are much greater for wives than for husbands. In the three non-European countries, the total employment rate of wives was between 60 per cent and 65 per cent: in Germany, it was below 53 per cent and in the Netherlands less than 34 per cent. Much of this

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[23] Here we depart from Garfinkel and Haveman (1977) and Haveman and Buron (1993), both of whom deduct an estimate of child care costs in deriving net (as opposed to gross) earnings capacity. While netting out the additional costs of working, including not only child care costs, but other costs is theoretically appropriate, we have not carried out such an imputation at this time. To do so would require information on the net costs of child care which will vary widely across countries due to differences in subsidy rates by age of children, tax treatment and non-profit provisions (e.g., German and Dutch kindergartens).

[24] The Australian data refer to the financial year (beginning 1 July) 1985-86, but the survey was actually conducted in the latter months of 1986. It is worth noting that our sample is a subset of the sample of countries included in the recent LIS-based study by Cancian and Schoeni (1992).

Table 6: Sample Size, by Gender and Labour Force Status[a] (Unweighted)

	United States 1986	Canada 1987	Australia 1986	Netherlands 1987	Germany 1984
Couples: Both With and Without Children					
Husbands	4198	4644	2962	1840	1493
Employed FYFT[b]	3009	3450	2673	1581	1194
Employed < FYFT	781	576	97	112	199
Unemployed	298	292	104	110	67
Not in Labour Force	110	326	88	37	33
Wives	4198	4644	2962	1840	1493
Employed FYFT[b]	1338	1422	843	196	306
Employed < FYFT	1335	1540	949	420	483
Unemployed	265	334	113	260	88
Not in Labor Force	1259	1348	1057	964	616
Couples With Children					
Husbands	2981	3426	2255	1336	1029
Employed FYFT[b]	2163	2560	2056	1156	837
Employed < FYFT	546	417	52	76	132
Unemployed	205	211	89	79	44
Not in Labour Force	67	239	58	25	16
Wives	2981	3426	2255	1336	1029
Employed FYFT[b]	787	886	476	43	134
Employed < FYFT	999	1204	798	289	332
Unemployed	196	263	102	197	62
Not in Labour Force	999	1073	879	807	501
Couples Without Children					
Husbands[b]	1217	1218	707	504	464
Employed FYFT[b]	846	890	617	425	357
Employed < FYFT	235	160	45	36	67
Unemployed	93	81	15	31	23
Not in Labour Force	43	87	30	12	17
Wives	1217	1218	707	504	464
Employed FYFT[b]	551	536	367	153	172
Employed < FYFT	336	336	151	131	151
Unemployed	70	71	11	63	26
Not in Labour Force	260	275	178	157	115

Notes: a) The sample includes individuals aged between 25 and 55 years.
b) FYFT = full-year, full-time.
Source: LIS database.

difference is explained by differences in the full-time employment rate of wives, with the rate of part-time employment varying in a relatively small range, from 23 per cent (in the Netherlands) to 33 per cent (in Canada and the United States).

An illustration of the size of these differences among wives' employment can be gained by noting that if wives in the Netherlands were to conform to the same patterns as those in the United States, an additional 391 married women (out of a total of 1840, equivalent to over 21 per cent) would have been in FYFT employment and a further 165 wives (9 per cent) would have been employed part-time. Clearly, these differences have the potential to have a considerable impact on the distribution of family earnings in the Netherlands, and thus how the degree of inequality compares with that in the United States.

Further comparison of the employment ratios of wives according to whether or not there are children in the family provides additional insight into the differences shown in Table 6.[25] In all five countries, full-time work is greater for wives without children than for those with children. However, this differential varies considerably across countries, from a factor of almost ten to one in the Netherlands, to around three to one in Germany, about 2.5 to one in Australia, to around 1.7 to one in North America. Generally, the rate of part-time work among wives shows much less variation with the presence or absence of children, although the rate is generally higher for those with children (except in the Netherlands). These patterns suggest that part-time work is the preferred option for most married women in all five countries and that this option (unlike full-time work) is not greatly constrained by the presence of children.

In summary, Table 6 reveals that the biggest cross-country differences in employment rates occur among wives and in relation to the prevalence of full-time work for those with children. These differences are likely to reflect prevailing social values and attitudes to the role of women as (unpaid) mothers or (paid) workers, combined with factors such as the availability, quality and cost of child care and the nature of the incentives built into the tax and transfer systems. These and other facilitative mechanisms shape and reinforce prevailing social attitudes by constraining the nature of labour market choices and influencing the terms on which those choices can be exercised.

5 Results

Earnings Regressions

As explained previously, the first step in our analysis involves estimating the human capital earnings function shown in general terms in equation (1). In undertaking this, we restricted ourselves to include only those variables which could be specified in a broadly comparable way for each country, to aid in comparing our results across countries. In some instances, this required us to aggregate variables into a smaller (but common) list of classifications than we would have chosen if we had been studying only one country. In others, we decided to omit variables entirely in order to maintain the comparability of our estimates. The full list of explanatory variables used is specified and defined in Table 7 and the resulting earnings function regression estimates are provided in Tables 8 and 9 for wives and husbands, respectively.

The two key human capital variables shown in Table 7 are years of experience and level of education. The former variable was constructed by assuming that schooling began at age 6 and that there had been continual labour force attachment for all individuals since leaving the education system. This is known to be an invalid approximation, particularly for women, though increasingly for men, but it was the best that could be done with the available data.[26] The education, occupation and industry variables were also fairly rudimentary, but were specified with a view to maximising the degree of cross-country comparability. We experimented with a number of other personal characteristics variables (see below) but those shown in Table 7 (place of birth, marital status, and the presence and age of children) performed consistently best overall (though not necessarily always in each individual country).

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[25] These comments must be interpreted with care because of the fact that the estimates in Table 6 are unweighted.

[26] While they do not consider women in their analysis, Lorenz and Wagner (1990) include a similar experience variable in their earnings functions using the LIS database, as do many others who have examined both men and women (e.g., Phipps, 1993; Knudsen and Peters, 1994).

Table 7: List of Explanatory Variables Included in the Estimated Earnings Functions **(a)**

Variable name	Definition
EXPER	Age in years **minus** years of education **minus** five
EXPSQD	EXPER squared
EDUCI	No or very low education
EDUC2*	Low education
EDUC3	Education to high school level or equivalent
EDUC4	Education beyond high school but below college level
EDUC5	College level education or higher
OCC1	Professional or administrative occupation
OCC2*	Sales, service or clerical occupation
OCC3	Blue collar occupation
INDI*	Primary industry
IND2	Manufacturing industry
IND3	Commerce industry
IND4	Other service industry
IND5	Financial service industry
IND6	Utilities industry
IND7	Construction industry
NATIVE	Equals 1 if native born, equals zero otherwise (i.e. overseas-born)
MARRIED	Equals 1 if married, equals zero otherwise
YNGCHILD	Equals 1 if youngest child aged under 6, equals zero otherwise
OLDCHLD	Equals 1 if youngest child aged 6 or over, equals zero otherwise

Note: a) Variables indicated with an asterisk(*) were used as the control in the estimated regression equations.

Turning to the results themselves, it is important to recall that we estimated the earnings functions on **all** individuals aged 25 to 55 years who were FYFT workers in each country. This explains why the sample sizes shown in Tables 8 and 9 differ from those which define our samples of couples shown in Table 6.[27] Before discussing the results themselves, some commentary on the alternative earnings function specifications experimented with is in order. Initially, we experimented with AGE (in years) and AGE squared instead of the experience variables (EXP and EXP squared), and even though the experience variables could be specified only approximately, they performed better. This, combined with our preference for the experience variables on theoretical grounds, explains why we kept those in our preferred model estimates.

We also tried several variants of the family structure variables, including (in addition to marital status) whether or not there were any children (aged under 18) present in the family, and whether or not the individual was a sole parent. We also experimented with five dichotomous family structure dummy variables (single person; childless couple; couple with children; sole parent; and other family type) but were unable to produce better estimates than those shown in Tables 8 and 9. Finally, we tried various formulations of the children variables before deciding that the specifications shown were superior.[28]

Our preferred results for women indicate that the human capital variables (experience and education) are generally significant, except in Australia where only the college education variable was statistically significant (Table 8).[29] For the remaining four countries, the earnings-experience profile follows an inverted U-shape which reaches its maximum value after 22 years (in the United States), 24 years (in Canada), 31 years (in the Netherlands) and 26 years (in Germany). The education variables generally conform to the anticipated pattern, with higher financial returns associated with higher levels of formal education. Our estimates indicate that the returns to college education are a good deal higher in North America than in Europe. Those with no or very low education in the Netherlands appear to face a particular disadvantage in terms of earnings. Native-born women have slightly lower earnings than foreign-born women in three out of four countries,

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[27] This also explains the inclusion of the marital status variable in the estimated earnings models. In addition, to be included in the regression sample only the individual needed to be age 25-55 while to be included in the sample of couples, both partners had to meet the age restriction.

[28] Our preferred specifications and the general features of our results contain a number of similarities with the earnings functions estimated for married women from the LIS data by Phipps (1993) and Knudsen and Peters (1994).

[29] The performance of the experience variable is encouraging, in light of the limitations of its specification for women, particularly for married women.

Table 8. Regression Estimates for Women Aged 25-55 who Worked Full-Year, Full-Time
(Dependent variable = log wage: standard errors in parentheses)

	United States 1986	Canada 1987	Australia 1986	Netherlands 1987	Germany 1984
Sample size	2030	1957	1078	272	427
Constant	9.400 *	9.557 *	9.541 *	10.007 *	10.004 *
	(0.081)	(0.096)	(0.137)	(0.081)	(0.124)
Experience	0.026 *	0.029 *	0.002	0.051 *	0.028 *
	(0.007)	(0.007)	(0.077)	(0.007)	(0.011)
Experience Squared	-5.907 *	-5.977 *	0.407	-8.100 *	-5.350 *
(x10,000)	(1.626)	(1.711)	(2.762)	(1.646)	(2.626)
Low/No education (a)	-0.188	-0.240 *	na	-0.370 *	na
	(0.115)	(0.075)		(0.041)	
Low education	-0.144 *	-0.163 *	-0.021	-0.133 *	-0.174 *
	(0.057)	(0.044)	(0.067)	(0.035)	(0.054)
Other education	0.130 *	0.133 *	0.097 *	na	-(0.032)
	(0.035)	(0.036)	(0.067)		(0.065)
College education	0.326 *	0.361 *	0.299 *	0.299 *	0.187 *
	(0.039)	(0.045)	(0.084)	(0.054)	(0.076)
Profesional [b]	0.410 *	0.434 *	0.354 *	na	0.365 *
	(0.057)	(0.068)	(0.073)		(0.084)
Sales, service, clerical	0.150 *	0.158 *	0.152 *	na	0.134
	(0.053)	(0.065)	(0.060)		(0.062)
Primary[c]	-0.474 *	-0.323 *	-0.926 *	0.211	0.421
	(0.107)	(0.094)	(0.134)	(0.221)	(0.380)
Commerce	-0.389 *	-0.232 *	-0.208 *	-0.070	-0.187 *
	(0.053)	(0.064)	(0.075)	(0.054)	(0.075)
Other service	-0.216 *	-0.199 *	-0.085	-0.101 *	-0.041
	(0.044)	(0.056)	(0.064)	(0.044)	(0.058)
Financial services	-0.155 *	-0.176 *	0.045	na	0.079
	(0.055)	(0.068)	(0.085)		(0.080)
Utilities	0.089	-0.014	-0.051	0.114	0.089
	(0.067)	(0.075)	(0.104)	(0.075)	(0.144)
Construction	-0.367 *	-0.072	-0.411 *	0.157	0.226
	(0.130)	(0.137)	(0.182)	(0.098)	(0.177)
Native-born	-0.002	-0.040	-0.013	na	0.006
	(0.032)	(0.040)	(0.043)	(0.054)	
Married	-0.058 *	-0.085 *	0.003	0.042	-0.018
	(0.028)	(0.031)	(0.044)	(0.028)	(0.043)
Child < 6	-0.090 *	-0.024	-0.346 *	-0.008	-0.145 *
	(0.041)	(0.044)	(0.068)	(0.085)	(0.070)
Child > = 6	-0.083 *	-0.172 *	-0.199 *	-0.158 *	-0.162 *
	(0.031)	(0.033)	(0.049)	(0.050)	(0.046)

Notes:
a) the missing education category is High school education.
b) The missing occupational category is Blue collar.
c) The missing industry category is Manufacturing.
* = statistically significant at the 10 per cent level.

but the differences are not significant. Women who are married tended to have significantly lower earnings than single women, but the presence of children has an even larger (negative) impact on female earnings than marriage itself.[30]

Somewhat to our surprise, the presence of young children did not have a statistically significant impact on female earnings in two countries, and only in Australia was the size of the impact of young children larger in absolute terms than the impact of older children . In the other two countries (the United States and Germany) where both child variables had a significant effect on female earnings, the size of the effect showed little variation with the age category of the child (though both effects were much bigger in Germany than in the United States).

Turning to the results for men in Table 9, we again found the human capital variables performed well, even in Australia. The earnings-experience profile reaches its peak after 33 years (in the United States and Canada), 27 years (in Australia, and Germany) and 36 years (in the Netherlands). In all cases these peaks occur some years later than the earnings peak for women. Again, the estimated returns to education are highest for males in the United States, while males with no or very low education in the United States and in the Netherlands have very low relative earnings. There is a pronounced earnings differential in favour of native-born as compared to overseas-born men. This differential is particularly large in the United States, where it refers to white versus non-white men regardless of place of birth.

Our estimates indicate that married men have higher earnings than single men with the same characteristics in all five countries, significantly so in three of them. This contrasts with the negative effects of marriage on female earnings in three countries shown in Table 8. Only in the United States was the marital status significant for both men and women, indicating a positive effect on male earnings which, in absolute terms, is considerably larger than the negative effect on female earnings. Finally, nowhere did either of the two child variables have a significant effect on male earnings. In combination with the estimated negative impact of children on female earnings, it is clear that, in terms of earnings at least, women bear most of the direct financial burden associated both with getting married and with child-rearing. Neither event has a negative effect on male earnings; in fact, there is a clear

[30] This last finding is consistent with that derived from the LIS data by McLanahan, Casper and Sorensen (1992) who conclude that a woman's risk of poverty is increased by motherhood or childbearing, rather than by marriage or (lack of) work.

Table 9. Regression Estimates for Men Aged 25-55 who Worked Full-Year, Full-Time
(Dependent variable = log wage: standard errors in parentheses)

	United States 1986	Canada 1987	Australia 1986	Netherlands 1987	Germany 1984
Sample size	3750	3870	2947	1802	1639
Constant	9.492 *	9.824 *	9.523 *	10.187 *	10.010 *
	(0.056)	(0.063)	(0.078)	(0.051)	(0.051)
Experience	0.030 *	0.031 *	0.031 *	0.052 *	0.042 *
	(0.005)	(0.005)	(0.007)	(0.004)	(0.004)
Experience Squared	-4.597 *	-4.632 *	-5.760 *	-7.213 *	-7.825
(x10,000)	(1.078)	(1.032)	(1.572)	(0.813)	(0.980)
Low/No education (a)	-0.464 *	-0.221 *	na	-0.480 *	na
	(0.084)	(0.041)			(0.025)
Low education	-0.229 *	-0.080 *	-0.080 *	-0.170 *	-0.133 *
	(0.035)	(0.029)	(0.040)	(0.024)	(0.025)
Other education	0.150 *	0.088 *	0.025	na	.087 *
	(0.028)	(0.027)	(0.038)		(0.023)
College education	0.387 *	0.287 *	0.217 *	0.276 *	0.309 *
	(0.029)	(0.034)	(0.047)	(0.031)	(0.028)
Profesional [(b)]	0.166 *	0.157 *	0.216 *	na	0.263 *
	(0.027)	(0.028)	(0.030)		(0.026)
Sales, service, clerical	-0.005	-0.027	0.098 *	na	0.104 *
	(0.030)	(0.029)	(0.035)		0.020
Primary[(c)]	-0.428 *	-0.229 *	-0.349 *	0.094	-0.015
	(0.059)	(0.037)	(0.051)	(0.059)	(0.051)
Commerce	-0.192 *	-0.196 *	-0.185 *	0.001	-0.063 *
	(0.031)	(0.033)	(0.039)	(0.024)	(0.026)
Other service	-0.244 *	-0.203 *	-0.068 *	0.002	-0.102 *
	(0.028)	(0.031)	(0.036)	(0.020)	(0.021)
Financial services	-0.029	-0.151 *	-0.051	na	0.156 *
	(0.051)	(0.056)	(0.048)		(0.038)
Utilities	0.056	-0.017	0.062	-0.016	-0.061 *
	(0.035)	(0.034)	(0.038)	(0.030)	(0.028)
Construction	-0.056	-0.211 *	-0.118 *	-0.030	-0.105 *
	(0.040)	(0.044)	(0.049)	(0.028)	(0.029)
Native-born	0.162 *	0.069 *	0.038	na	0.065 *
	(0.026)	(0.029)	(0.026)		(0.024)
Married	0.098 *	0.033	0.063 *	0.062 *	0.017
	(0.025)	(0.028)	(0.034)	(0.022)	(0.022)
Child < 6	0.024	0.020	0.006	0.022	0.022
	(0.028)	(0.028)	(0.032)	(0.021)	(0.022)
Child > = 6	0.033	0.020	-0.011	0.017	0.011
	(0.250)	(0.250)	(0.310)	(0.020)	(0.019)

Notes:
a) the missing education category is High school education.
b) The missing occupational category is Blue collar.
c) The missing industry category is Manufacturing.
* = statistically significant at the 10 per cent level.

`marriage premium' in the male earnings structures in all five countries.[31]

Distributional Analysis

Having presented and discussed our estimated earnings regressions, we now use these to estimate the distributional impact of earnings capacity in the series of sequenced stages described earlier. The focus of our analysis is now narrowed to the samples of prime-aged couple families summarised in Table 6. We discuss our results in two stages, focusing first on the level of mean earnings, followed by a more explicit assessment of their distributional implications.

Mean Earnings

We first show (in Table 10) how the level of mean earnings varies in each country as we move from the distribution of actual family earnings to the progressive replacement of actual earnings by earnings capacity in the series of stages described earlier.[32] As previously noted, the first stage in this process involves the replacement of actual earnings by earnings capacity for FYFT workers only, and provides evidence on the predictive accuracy of the estimated earnings functions. This step causes mean earnings to rise overall in all five countries, though to varying degrees.[33] The change in mean earnings within each decile is, however, not always positive (e.g., in Canada) and the effect tends to be generally smaller in the middle of the distribution than at either extreme. The largest proportionate increase in decile mean earnings occurs in the lowest decile in all five countries - probably a reflection of the treatment of self-employment income described earlier.

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[31] This is consistent with the LIS work by Schoeni (1990) who found that married men earn more than single men, all else equal.

[32] When earnings capacity was predicted from the estimates in Tables 8 and 9 for the unemployed and those not in the labor force, zero values were assigned to the occupation and industry variables. This implies that these individuals are assumed to work in blue collar manufacturing industry occupations (see Table 7).

[33] Part of the reason for this is that the self-employed now have an earnings capacity attributed to them, whilst previously (as explained earlier) because their self-employment income was excluded, their earnings were low or zero.

Table 10: Decile Mean Earnings for Actual Earnings and Alternative Earnings Capacity Populations [a] (National currencies)

Country/decile	Actual family earnings (1)	Earnings capacity (FYFT) (2)	Earnings capacity (PT) (3)	Earnings capacity (UN) (4)	Earnings capacity (NILF) (5)	Ratio (5)/(1)
United States, 1986						
First	1940	5510	9850	11780	19110	10.01
Second	12640	14530	19630	21000	26770	2.12
Third	19690	20360	25600	26830	32430	1.65
Fourth	24940	25390	30960	32390	37770	1.51
Fifth	29450	30360	36580	38240	43040	1.46
Sixth	34320	36140	42750	44300	49120	1.43
Seventh	39900	42870	49700	51730	56340	1.41
Eighth	46460	51490	59170	61470	66160	1.42
Ninth	55850	64630	74300	76790	80950	1.45
Tenth	83310	109800	125300	129610	134430	1.61
Total	**34850**	**40110**	**47380**	**49420**	**54610**	**1.57**
Canada, 1987						
First	2920	6890	10460	12260	20460	7.01
Second	14740	16150	20430	21880	28470	1.93
Third	23710	21920	26090	27820	33800	1.43
Fourth	29830	26620	31860	33350	38800	1.30
Fifth	35300	31750	37850	39310	44280	1.25
Sixth	40730	37510	44220	45750	50110	1.23
Seventh	46510	44660	51000	52530	56680	1.22
Eighth	53120	52890	59740	61210	64970	1.22
Ninth	62130	65160	72370	74260	79020	1.27
Tenth	89370	105310	116360	120020	123890	1.39
Total	**39840**	**40890**	**47040**	**48840**	**54050**	**1.36**
Australia, 1986						
First	0	5110	6210	8570	15840	-
Second	4870	12990	14820	16250	22060	4.53
Third	15990	17470	19950	21090	26370	1.65
Fourth	21210	21500	24170	25190	30670	1.45
Fifth	25340	25780	28910	29760	35200	1.39
Sixth	29010	30730	34020	34830	39940	1.38
Seventh	32880	36270	40070	40670	45000	1.37
Eighth	37240	43630	47210	47810	52700	1.42
Ninth	43530	56000	60010	60940	66010	1.52
Tenth	60940	92950	97510	101870	106490	1.75
Total	**27100**	**34240**	**37290**	**38700**	**44030**	**1.62**

(Continued over page)

Table 10: Decile Mean Earnings for Actual Earnings and Alternative Earnings Capacity Populations[a] (National currencies) (Continued)

Country/decile	Actual family earnings (1)	Earnings capacity (FYFT) (2)	Earnings capacity (PT) (3)	Earnings capacity (UN) (4)	Earnings capacity (NILF) (5)	Ratio (5)/(1)
Netherlands, 1987						
First	2220	15440	17090	28230	55900	25.2
Second	30580	33670	34680	39440	65780	2.15
Third	37390	40580	42090	48440	73030	1.95
Fourth	42450	46760	50120	57360	78840	1.86
Fifth	47740	53080	58520	66700	83940	1.76
Sixth	53810	60240	68320	76070	90070	1.67
Seventh	62060	68620	78070	83930	98030	1.58
Eighth	71640	79630	88920	94230	107670	1.50
Ninth	83390	96590	106210	109730	123140	1.48
Tenth	119220	144990	151430	155990	170720	1.43
Total	**55050**	**63960**	**69540**	**76010**	**94710**	**1.72**
Germany, 1984						
First	5480	17370	22560	26140	50540	9.22
Second	28650	31060	34320	37330	63010	2.20
Third	35250	37380	42360	46210	73120	2.07
Fourth	40430	42750	51480	54920	82070	2.03
Fifth	45630	48400	60090	64250	90750	1.99
Sixth	51740	58550	69870	75640	101390	1.96
Seventh	58610	61660	83220	88440	113040	1.93
Eighth	66880	72270	98600	105290	127650	1.91
Ninth	77410	92110	126010	132310	152090	1.96
Tenth	105870	156230	191950	194250	214530	2.03
Total	**51590**	**61380**	**78050**	**82480**	**106820**	**2.07**

Note: a) The structure of this table is explained in the main text. All figures have been rounded to the nearest 10 currency units.

Source: LIS database.

The next three columns in Table 10 allow an estimate to be made of the impact of replacing actual earnings by estimated (FYFT) earnings capacity for part-time workers, the unemployed and those not in the labour force, respectively. In general, the smallest effects are associated with including earnings capacity for the unemployed, while the largest effects occur when estimated earnings capacity is

incorporated for those who are not in the labour force.[34] Since the great majority of those not in the labour force are women working in the domestic economy, (i.e. involved in household production), these aspects of the results illustrate the overall magnitude of the value of home production relative to market earnings. The overall cumulative effect of the four sequenced earnings adjustments causes mean earnings to rise by 36 per cent from their observed value in Canada, 57 per cent in the United States, 62 per cent in Australia, 77 per cent in the Netherlands and 107 per cent in Germany.

Earnings Shares and Inequality

Table 11 shows the effects of including earnings capacity on the distribution of earnings at each stage, while the final distributional results in Table 12 show the percentile ratios which summarise the degree of inequality in each of the distributions.[35] In terms of the overall distributional impact of including earnings capacity, a similar pattern emerges within each country.

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[34] Earnings capacity can be less than actual earnings for several reasons, including because of the influence of good fortune, or the possibility that earnings capacity is over-utilised. In relation to the latter, we note that we made no attempt to adjust hours of work for those who were working beyond the full-time limit in each country.

[35] Green, Coder and Ryscavage (1992) note that use of the percentile ratios also avoids the problems arising from top-coding of high (and, in some countries, bottom-coding of low) incomes which, if they differ between countries, can affect cross-country inequality comparisons.

Table 11: Decile Earnings Shares for Actual Earnings and Alternative Earnings Capacity Populations (Percentages)

Country/decile	Actual family earnings (1)	Earnings capacity (FYFT) (2)	Earnings capacity (PT) (3)	Earnings capacity (UN) (4)	Earnings capacity (NILF) (5)	(5) minus (1)
United States, 1986						
First	0.6	1.4	2.1	2.4	3.5	+2.9
Second	3.6	3.6	4.1	4.3	4.9	+1.3
Third	5.7	5.1	5.4	5.4	5.9	+0.2
Fourth	7.2	6.3	6.5	6.6	6.9	-0.3
Fifth	8.5	7.6	7.7	7.7	7.9	-0.6
Sixth	9.8	9.0	9.0	9.0	9.0	-0.8
Seventh	11.5	10.7	10.5	10.5	10.3	-1.2
Eighth	13.3	12.8	12.5	12.4	12.1	-1.2
Ninth	16.0	16.1	15.7	15.5	14.8	-1.2
Tenth	23.9	27.4	26.4	26.2	24.6	+0.7
Gini coefficient	**0.356**	**0.383**	**0.356**	**0.349**	**0.308**	**13.5**[(a)]
Canada, 1987						
First	0.7	1.7	2.2	2.5	3.8	+3.1
Second	3.7	4.0	4.3	4.5	5.3	+1.6
Third	6.0	5.4	5.5	5.7	6.3	+0.3
Fourth	7.5	6.5	6.8	6.8	7.2	-0.3
Fifth	8.9	7.8	8.0	8.0	8.2	-0.7
Sixth	10.2	9.2	9.4	9.4	9.3	-0.9
Seventh	11.7	10.9	10.8	10.8	10.5	-1.2
Eighth	13.3	12.9	12.7	12.5	12.0	-1.3
Ninth	15.6	15.9	15.4	15.2	14.6	-1.0
Tenth	22.4	25.8	24.7	24.6	22.9	+0.5
Gini coefficient	**0.335**	**0.361**	**0.336**	**0.328**	**0.283**	**15.5**[(a)]
Australia, 1986						
First	0.0	1.5	1.7	2.2	3.6	+3.6
Second	1.8	3.8	4.0	4.2	5.0	+3.2
Third	5.9	5.1	5.3	5.5	6.0	+0.1
Fourth	7.8	6.3	6.5	6.5	7.0	-0.8
Fifth	9.3	7.5	7.8	7.7	8.0	-1.3
Sixth	10.7	9.0	9.1	9.0	9.1	-1.6
Seventh	12.1	10.6	10.7	10.5	10.2	-1.9
Eighth	13.7	12.7	12.7	12.4	12.0	-1.7
Ninth	16.1	16.4	16.1	15.7	15.0	-1.1
Tenth	22.5	27.1	26.2	26.3	24.2	+1.7
Gini coefficient	**0.362**	**0.379**	**0.363**	**0.353**	**0.302**	**16.6**[(a)]

(Continued over page**)**

Table 11: **Decile Earnings Shares for Actual Earnings and Alternative Earnings Capacity Populations** (Percentages) (Continued)

Country/decile	Actual family earnings (1)	Earnings capacity (FYFT) (2)	Earnings capacity (PT) (3)	Earnings capacity (UN) (4)	Earnings capacity (NILF) (5)	(5) minus (1)
Netherlands, 1987						
First	0.4	2.4	2.5	3.7	5.9	+5.5
Second	5.6	5.3	5.0	5.2	6.9	+1.3
Third	6.8	6.3	6.1	6.4	7.7	+0.9
Fourth	7.7	7.3	7.2	7.5	8.3	+0.6
Fifth	8.7	8.3	8.4	8.8	8.9	+0.2
Sixth	9.8	9.4	9.8	10.0	9.5	-0.3
Seventh	11.3	10.7	11.2	11.0	10.4	-0.9
Eighth	13.0	12.4	12.8	12.4	11.4	-1.6
Ninth	15.1	15.1	15.3	14.4	13.0	-2.1
Tenth	21.7	22.7	21.8	20.5	18.0	-3.7
Gini coefficient	**0.306**	**0.299**	**0.299**	**0.263**	**0.180**	**41.2**[(a)]
Germany, 1984						
First	1.1	2.8	2.9	3.2	4.7	+3.6
Second	5.6	5.1	4.4	4.5	5.9	+0.3
Third	6.8	6.1	5.4	5.6	6.8	0.0
Fourth	7.8	7.0	6.6	6.7	7.7	-0.1
Fifth	8.8	7.9	7.7	7.8	8.5	-0.3
Sixth	10.0	8.9	9.0	9.2	9.5	-0.5
Seventh	11.4	10.0	10.7	10.7	10.6	-0.8
Eighth	13.0	11.8	12.6	12.8	12.0	-1.0
Ninth	15.0	15.0	16.1	16.0	14.2	-0.8
Tenth	20.5	25.5	24.6	23.6	20.1	-0.4
Gini coefficient	**0.289**	**0.320**	**0.334**	**0.320**	**0.237**	**18.0**[(a)]

Note: a) Percentage reduction.

For other Notes and Source, see Table 10.

The replacement of actual earnings by earnings capacity for FYFT workers has an ambiguous effect on inequality, the Lorenz curves of the two distributions intersecting in the middle ranges in all five countries. Each of the next three steps causes a decline in inequality in the United States and Canada, and while this is not always true for each pairwise comparison in the other three countries, the final distribution of earnings capacity always Lorenz-dominates the distribution of actual family earnings among FYFT workers.

Some interesting and informative patterns emerge from the Gini coefficients shown in Table 11. In all countries except the Netherlands, the replacement of actual earnings by earnings capacity for FYFT workers causes the Gini coefficient to increase. This occurs despite the higher earnings capacity estimates in the lower deciles, these being more than offset by the changes at the upper end of the distribution. Imputing earnings capacity for part-time workers causes the Gini coefficient to decline, except in Germany (where it increases) and the Netherlands (where it remains unchanged). These first two steps tend to offset each other in terms of their impact on the Gini coefficient in all countries except Germany, so that the coefficients in columns (1) and (3) of Table 11 are virtually the same. Imputing earnings capacity to the unemployed and to those not in the labour force causes the Gini to decline further in all countries, with the largest effects arising from non-participation. The results thus indicate that the existence of **both** unemployment **and** non-participation cause actual earnings inequality to be greater than it would be if all labour was fully utilised at market earnings capacity.

The effect on inequality of non-participation alone can be estimated from the Gini coefficients in columns (4) and (5). These show that this adjustment causes a decline in the Gini of around 12 per cent in the United States, 14 per cent in Canada and Australia, 32 per cent in the Netherlands and 26 per cent in Germany. These reductions explain much of the overall decline in the Gini coefficients between the first and last stages shown in the final column of Table 11 and point to the quantitative significance for inequality of our implied estimates of the value of home production. Perhaps of greater significance than the overall size of these effects, however, is its variation across countries, specifically the very large effects estimated for the Netherlands.

Overall, these results thus indicate that both non-employment (due to either unemployment or the absence of labour force participation) and underemployment (due to part-time work) cause the distribution of earnings to be more unequal than would be the case if everyone worked full-time, full year and earned to the limits of their capacity. The summary statistics in Table 12 reinforce those in Table 11, and also serve to highlight the fact that the biggest distributional effects occur at the bottom of the distribution (as is also apparent from Tables 10 and 11) and that those associated with part-time work and non-participation in the labour force dominate those associated with unemployment.[36]

[36] This may be due to the fact that the unit of analysis being used is the couple rather than the individual, combined with the relatively low incidence of unemployment compared with part-time work and non-participation (see Table 6).

Table 12: Indicators of Inequality in Five Distributions in Five Countries [(a)]

(Percentile ratios)

Percentile Ratios	Actual family earnings	Earnings capacity (FYFT)	Earnings capacity (PT)	Earnings capacity (UN)	Earnings capacity (NILF)
United States, 1986					
P_{90}/P_{50}	1.97	2.26	2.15	2.14	2.02
P_{50}/P_{10}	4.00	3.02	2.49	2.36	1.93
P_{90}/P_{10}	7.88	6.82	5.34	5.04	3.95
P_{80}/P_{50}	1.56	1.71	1.65	1.64	1.57
P_{50}/P_{20}	1.95	1.88	1.73	1.72	1.55
P_{80}/P_{20}	3.04	3.23	2.85	2.82	2.43
Canada, 1987					
P_{90}/P_{50}	1.81	2.14	2.01	1.99	1.93
P_{50}/P_{10}	4.03	2.76	2.40	2.26	1.86
P_{90}/P_{10}	7.32	5.91	4.83	4.50	3.59
P_{80}/P_{50}	1.50	1.70	1.59	1.58	1.49
P_{50}/P_{20}	1.90	1.75	1.77	1.71	1.51
P_{80}/P_{20}	2.85	2.97	2.81	2.70	2.25
Australia, 1986					
P_{90}/P_{50}	1.76	2.34	2.27	2.22	2.01
P_{50}/P_{10}	*	2.79	2.65	2.37	1.91
P_{90}/P_{10}	*	6.53	6.00	5.26	3.84
P_{80}/P_{50}	1.47	1.72	1.66	1.65	1.53
P_{50}/P_{20}	2.35	1.84	1.80	1.69	1.55
P_{80}/P_{20}	3.46	3.16	2.99	2.78	2.38
Netherlands, 1987					
P_{90}/P_{50}	1.81	1.96	1.86	1.69	1.55
P_{50}/P_{10}	2.63	1.89	2.11	2.04	1.41
P_{90}/P_{10}	4.77	3.72	3.92	3.45	2.19
P_{80}/P_{50}	1.53	1.52	1.51	1.39	1.31
P_{50}/P_{20}	1.45	1.51	1.66	1.66	1.25
P_{80}/P_{20}	2.22	2.29	2.51	2.31	1.64
Germany, 1984					
P_{90}/P_{50}	1.76	2.10	2.28	2.17	1.76
P_{50}/P_{10}	2.28	1.86	2.14	2.14	1.69
P_{90}/P_{10}	4.00	3.90	4.87	4.65	2.97
P_{80}/P_{50}	1.47	1.57	1.68	1.69	1.45
P_{50}/P_{20}	1.50	1.51	1.67	1.68	1.40
P_{80}/P_{20}	2.20	2.36	2.80	2.84	2.03

Note: a) The distributions are described in the main text.

Source: LIS database.

The earnings capacity estimates included in the final stage of the analysis refer to those who are not in the labour force, the great majority of whom (as noted earlier) are women. Comparison of the estimates in the columns of Tables 10, 11, and 12 are thus relevant to assessing the effects on living standards and the distribution of earnings of including a value for home production when it is estimated using the earnings capacity approach.

Inequality Comparisons: A Summary

Our first interest lies in assessing the distributional impact of the value of household production (and the other adjustments), particularly in seeing how this varies across countries and thus affects cross-country comparisons of inequality. To do this, we compared the observed distributions shown in the first column of Tables 11 and 12 with the full earnings capacity distributional estimates shown in the last column of each Table. On the basis of the actual distributions of earnings, Table 11 shows Germany to have the most equal distribution of earnings, followed by Canada and the Netherlands where a clear inequality ranking is not possible. The United States and Australia have the most earnings inequality, with the distribution in the United States less equal than that in Canada, and the Australian distribution less equal than that in the Netherlands.

Thus, even given the lower participation rates of married women in Germany and the Netherlands, in combination with the fact that wives' earnings have an equalising effect on family earnings (Table 4), the distributions of family earnings in Germany and the Netherlands are still relatively equal compared with those in Australia, Canada and the United States. This observation suggests that a clearer earnings inequality ranking should emerge when cross-country variations in underemployment and non-employment are eliminated by replacing actual earnings by earnings capacity.

The inequality measures in Tables 10, 11 and 12 bear out this expectation. When the full earnings capacity distributions are compared across countries, an unambiguous inequality ranking emerges, with the Netherlands now exhibiting the least inequality of earnings capacity, followed by Germany, Canada, Australia and the United States (in that order). These results thus confirm that the earnings inequality ranking of countries produced in other studies using the LIS database are not purely a result of country differences in the degree of labour market attachment among members of the population of workforce age. Indeed, the methods we have used to standardise these differences provides not only a clearer cross-country

ranking of family earnings inequality, but one which reinforces the picture which others (e.g., Gottschalk, 1993) have already documented.

Value of Home Production

The second major objective of this paper is to ascertain the gross value of home production using the earnings capacity approach to measure the opportunity cost of home production. We have not tried to estimate a net value of added market work, e.g., taking gross earnings capacity and netting-out the additional costs of working (e.g., transportation, work clothing, etc.) the costs of replacement services (e.g., child care, home services, etc.) or the taxes on additional earnings, to arrive at a true net added value of out-of-home work. Our objective is to get an idea of the gross value of home production relative to actual earnings by determining its opportunity costs. Our home production values come from time underemployed (working part-time), time unemployed, and time not in the labour force. Moreover, the aggregate values include home production by both men and women. We then disaggregate the contribution of each sex to this aggregate value.

Aggregate Values

We begin (Table 13) by taking actual overall average earnings and overall average earnings capacity from Table 10 and placing each in a ratio format. Thus, we estimate the value of home production relative to the actual earnings of prime age men and women working full-year, full-time (Panel A) and relative to our estimate of earnings capacity for these same full-year, full-time men and women (Panel B).[37]

[37] Recall that our estimates of full-year, full-time earnings capacity (D2) differed from actual earnings for various reasons, including the existence of more than full-year, full-time earnings for some men, estimation errors and our treatment of the self-employed.

Table 13: Estimated Gross Values of Home Production by Men and Women[a]

Country	Actual Family Earnings	Earnings Capacity			
		FYFT	PT	UN	NILF
Panel A: Home Production Relative to Actual Earnings					
United States	100	115	136	142	157
Canada	100	103	118	123	136
Australia	100	126	138	143	162
The Netherlands	100	116	126	138	172
Germany	100	119	151	160	207
		Earnings Capacity			
		FYFT	PT	UN	NILF
Panel B: Home Production Relative to Earnings Capacity					
United States		100	118	123	137
Canada		100	115	119	132
Australia		100	110	113	129
The Netherlands		100	109	119	148
Germany		100	127	134	174

Source: LIS database and Table 10.

As might be expected, the overall value of home production (as a percentage of either actual earnings or earnings capacity) varies inversely with the rates of unemployment, part-time work, and labour force non-participation (the latter being of particular importance for married women). Germany and the Netherlands tend to have the highest overall value added for home production, with Canada having the least, relative to actual earnings. Here, the total value added varies from 36 per cent to 107 per cent of actual earnings.

If the basis on which home production is calculated is expressed relative to **earnings capacity** (not to actual earnings), the total value added varies from 29 per cent to 74 per cent of the base, with Germany and the Netherlands still highest, but with the other three nations more closely bunched at between 30 per cent and 35 per cent value added. The contribution of various types of workers to home production is also quite varied. In Germany, home production for part-time workers is 51 per cent of total earnings all by itself (Panel A, second column).

Unemployment adds between five per cent and to 12 per cent as a separate factor, while the largest adjustment is for those not in the labour force, where 13 per cent to 47 per cent of the total value of home production is added to the other components.

Production by Men and Women

The total value of home production can be separated for men and women as shown in Table 14. Here, the estimates of home production relative to either actual full-year, full-time earnings or estimated earnings capacity from Table 13 are broken down by gender. To obtain the percentage of value added attributed to men and to women at each stage, an additional step was added to the calculations in Table 13. When moving from actual earnings to the value added of part-time workers and in sequence to those not in the labour force, the value added was first calculated for men and then for both men and women, with the difference being attributed to women.

The percentage of the total value of home production attributable to women (based on actual earnings) ranged from around 45 per cent in the United States and Australia to around 70 per cent in the other three countries. If the value of home production is expressed relative to earnings capacity, the general trend remains the same though the actual proportion of the value added which is attributable to women is higher in all five countries. Whichever base is used, countries with the highest total value added (Germany and the Netherlands) are also the countries with the largest percentage of the value attributable to women.

All of these estimates must, however, be interpreted carefully because they are derived not by valuing the **actual** amount of time spent on home production by men and women, respectively but by **assuming** that all time not spent in full-time market work is devoted, by men and women alike, to household production. This assumption is at odds with the evidence from time-use surveys, which indicates that women devote a good deal more time to unpaid domestic work than men (e.g. ABS, 1994). However, we chose to explore the earnings capacity methodology because we were not able, using the LIS data, to base our estimates on time-use studies.

Table 14: Gross Values of Home Production - Percentage Attributable to Men and Women

	Actual Family Earnings	Earnings Capacity						Total Change	
		PT	Percent Male	UN	Percent Male	NILF	Percent Male	Percent Male	Percent Female
Panel A: Home Production Relative to Actual Earnings									
United States	100	136	75	142	67	157	7	56	44
Canada	100	118	50	123	20	136	15	33	67
Australia	100	138	74	143	60	162	11	53	47
Netherlands	100	126	69	138	25	172	9	33	67
Germany	100	151	47	160	44	207	2	27	73
		Earnings Capacity						Total Change	
	FYFT	PT	Percent Male	UN	Percent Male	NILF	Percent Male	Percent Male	Percent Female
Panel B: Home Production Relative to Earnings Capacity									
United States	100	118	56	123	80	136	15	44	56
Canada	100	113	40	119	25	132	23	28	72
Australia	100	109	11	113	75	129	13	21	79
Netherlands	100	109	11	119	20	148	7	10	90
Germany	100	127	15	134	43	174	5	12	88

Source: LIS database and Table 10.

6 Summary and Conclusion

This paper has produced the first comparable estimates of earnings capacity across five nations using the LIS database. While our methods should be seen as exploratory and our results preliminary, several interesting findings have emerged with respect to our estimates of the overall gross value of home production and its effect on cross-national comparisons of inequality among married couple households.

Measures of inequality in earnings capacity (assumed to equal the sum of market earnings and household production) reinforce patterns found in market earnings alone when large differences in unemployment, part-time work and labour force non-participation in each nation have been removed by the earnings capacity methodology. Moreover, the gross value of home production (including both men and women with no adjustments for the costs of working, child care, or household work forgone) is both large and varies substantially across countries.

The earnings capacity measure of the gross value of time not spent in paid work in Germany exceeds total actual earnings in 1984, and was at a minimum of 36 per cent of total actual earnings in Canada in 1987. But the source of the majority of the value added by home production depends on the country studied and the basis of comparison. In all five countries, married women make the largest contribution to home production based on non-labour force participation.

Additional research will be aimed at refining these estimates, netting-out various work-related costs, and considering more carefully how to estimate the **net** value added by home production. We might also attempt to adjust for time paid for but not worked (vacations and holidays). Germany and the Netherlands which have the highest overall value of home production (relative to earnings) also have the highest total number of vacation days and holidays. Finally, a good deal of scope exists for improving the way this kind of analysis treats the self-employed and income from self employment. We believe that we have only just begun this line of research.

Appendix One

Table A.1: Derivation of Labour Force Status Variables

	United States 1986	Canada 1987	Australia 1985-86	The Netherlands 1987	Germany 1984
HRSHD/HRSSP	Number of hours	Number of hours	0: Nonworker 1: <10 hours 2: 10-19 hours 3: 20-24 hours 4: 25-29 hours 5: 30-34 hours 6: 35-39 hours 7: 40-44 hours 8: 45-49 hours 9: 50+ hours	Number of hours	Number of hours
WEEKHDFT/WEEKSPFT	Number of weeks	Number of weeks	Number of weeks	Number of weeks	Number of weeks
HEAD/SPOUSE 1. FYFT 2. <FYFT 3. No work	HRSHD(SP) = 35 and WEEKSHD(SP)FT = 48 HRSHD(SP) 1-34 and WEEKHD(SP)FT = 48 or HRSHD(SP) > 0 and WEEKHD(SP)FT < 48 HRSHD(SP) = 0				
LFSHD/LFSSP	-1: No spouse 1: Employed + working 2: Employed, not a work 3: Unemployed 4: NILF keeping house 5: NILF school 6: NILF disabled/ill 7: NILF other	-1: No spouse 1: Employed 2: Unemployed 3: NILF	-1: No spouse 3: NILF school 4: Unpd. Volunteer 5: Employed FT 6. Employed PT 7: Unemployed 8: NILF	-1: No spouse 0: Not labeled 1: NILF 2: Looking for work 3: In labour force 4: School	-1: No spouse 0: missing/NA 1: NILF 2: Looking or layoff 3: Employed civilian 4: School 5: Mandatory military 6: Professional soldier

Appendix One

Table A.1: Derivation of Labour Force Status Variables (Continued)

	United States 1986	Canada 1987	Australia 1985-86	The Netherlands 1987	Germany 1984
Labour Force Status					
1. FYFT	HEAD = 1	LFSHD = 1 and HEAD = 1	LFSHD = 5	LFSHD = 3 and HEAD = 1	LFSHD = 3 and HEAD = 1
2. < FYFT	HEAD = 2	LFSHD = 1 and HEAD = 2	LFSHD = 6	LFSHD = 3 and HEAD = 2	LFSHD = 3 and HEAD = 2
3. Unemployed	LFSHD = 2 or LFSHD = 3	LFSHD = 2	LFSHD = 7	LFSHD = 2 or LFSHD = 3 and HEAD = 3	LFSHD = 2 or LFSHD = 3 and HEAD = 3
4. NILF	LFSHD GT = 3	LFSHD = 3	LFSHD = 3 or LFSHD = 4 or LFSHD = 8	LFSHD = 0 or LFSHD = 1 or LFSHD = 4	LFSHD = 0 or LFSHD = 1 or LFSHD = 4

Source: LIS database.

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