Impact Project

Impact Centre
The University of Melbourne
153 Barry Street, Carlton
Vic. 3053 Australia
Phones: (03) 344 7417
Telex: AA 35185 UNIMEL
Telegrams: UNIMELB, Parkville

IMPACT is an economic and demographic research project conducted by Commonwealth Government agencies in association with the Faculty of Economics and Commerce at The University of Melbourne, the Faculty of Economics and Commerce and the Departments of Economics in the Research Schools at the Australian National University and the School of Economics at La Trobe University.

SOURCES OF INEQUALITY BETWEEN MALE AND FEMALE INCOMES IN AUSTRALIA

by

Nisha Agrawal

University of Melbourne

General Paper No. G-73 Melbourne October 1986

ISSN 0813 7986
ISBN 0 642 10088 8

Abstract

This paper examines the influence of labour force status, number of hours worked, education qualifications, experience and occupation as sources of inequality between male and female incomes in Australia. A decomposition method is used to identify the effect of each factor on male/female inequality. This strategy involves successively removing persons who differ with respect to each of these factors from the population under study and then decomposing the inequality in the remaining sub-population into inequality within each sex and inequality between the sexes. This decomposition is done using the Shorrocks I_0 Index. The study is based on unit record data from the 1981-82 Income and Housing Survey conducted by the ABS. It finds that a significant proportion of the inequality between the incomes of the sexes can be explained by their differences with respect to the factors listed above. The major source of the inequality, however, seems to be the strong occupational stereotyping of the sexes -- typically a higher proportion of women are being employed in lower paying jobs than men.

Contents

Tables

Figures

Lewis, D.E. (1982), "The Measurement of the Occupational and Industrial Segregation of Women", Journal of Industrial Relations, 24, 3, September.

Meagher, G.A. and Dixon, P.B. (1986), "Analysing Income Distribution in Australia", forthcoming, Economic Record.

Shorrocks, A.F. (1980), "The Class of Additively Decomposable Inequality Measures", Econometrica, 48, 3, April.

Theil, H. (1967), Economics and Information Theory, North-Holland, Amsterdam.

SOURCES OF INEQUALITY BETWEEN MALE AND FEMALE INCOMES IN AUSTRALIA

by

Nisha Agrawal*

1 INTRODUCTION

In a recent report to the Economic Planning and Advisory Council, Bonnell, Dixon and Meagher (1985) present a description of income distribution in Australia for the period 1973/74 to 1981/82.[1] One notable observation of their study is that the incomes of males are, on average, considerably higher than those of females, even after accounting for differences in their labour force involvement. For example, they find that in 1978/79 the mean earned income of full-year full-time male workers was nearly 40 per cent higher than that of full-year full-time female workers. They are unable to explain this gap in the earnings of male and female workers on the basis of the differences in their occupations or qualifications.

This paper examines and explains some of this gap in the earnings of the sexes. It draws upon the voluminous literature on this subject to identify sources of the male/female income differential; see

* I would like to thank Alan Powell, Tony Meagher, Peter Higgs and Mark Horridge for helpful comments.

Haig (1982), Jones (1982), Chapman and Miller (1983), Chapman (1984a,b), Chapman and Mulvey (1985), Lewis (1982). The literature survey reveals two important issues related to this differential. First, within an occupation, men on average earn higher hourly wages than women with similar education and experience. Second, across occupations, men tend to be employed in jobs with higher status and higher wages than women. The first issue is usually examined using the "earnings function" approach in which a measure of earnings is regressed on various productivity-related factors such as education and experience. The second issue is analysed by calculating various indices of segregation which are used to identify and examine male-dominated and female-dominated occupations.

This paper re-examines both these issues. In examining the first issue, it deviates from the earnings function approach used in the previous literature and uses the decomposition technique used by Bonnell et al. instead. Unlike Bonnell et al., however, who use aggregated tables published by the Australian Bureau of Statistics (ABS), this study uses unit record data from the 1981-82 Income and Housing Survey (IHS) conducted by the ABS. This is the only unit record tape of Australian data publicly available and is an extremely rich source of data. It consists of records for approximately 30,000 persons which, when weighted appropriately, provide estimates for over 11 million persons. The data allows for a detailed examination of the occupational distribution of the sexes. In this study this issue is analysed for 42 fairly narrowly defined occupations, a disaggregation which enables analysis in greater depth than most of the earlier studies in this area.

REFERENCES

Australian Bureau of Statistics (1984), Income and Housing Survey/Sample File 1981-82.

Bonnell, S.M., Dixon, P.B. and Meagher, G.A. (1985), "A Description of Income Distribution in Australia : 1973-74 to 1981-82", Discussion Paper No. 85/04, Office of Economic Planning Advisory Council, Canberra.

Chapman, B.J. (1984a), "Sex Differences in Earnings : Changes over the 1970's in the Australian Public Service", in B.J. Chapman, J.E. Isaac and J.R. Niland (eds), Australian Labor Economics : Readings, 3rd edition, MacMillan, Melbourne.

Chapman, B.J. (1984b), "Australian Women and Wages : A Survey of Research", in Bureau of Labor Market Research, Proceedings from a Symposium on Women in the Australian Economy, AGPS, Canberra.

Chapman, B.J. and Miller, P. (1983), "Determination of Earnings in Australia : An Analysis of the 1976 Census", in Keith Hancock et al. (eds), Japanese and Australian Labour Markets : A Comparative Study, Australia-Japan Research Centre, Canberra.

Chapman, B.J. and Mulvey, C. (1985), "An Analysis of the Causes of Sex Differences in Australian Wages", Discussion Paper in Industrial Relations No. 6, Department of Industrial Relations, University of Western Australia, Perth.

Craigie, R. (1979), "Some Comments on the ABS Occupational Classification System and the IMPACT Occupational Grouping", IMPACT Project Preliminary Working Paper No. IP-08, July.

Crawford, J.G. (1979), (Chairman) Report of Working Group No. 2, Study Group on Structural Adjustment, Commonwealth of Australia, Canberra.

Department of Employment and Industrial Relations and the Australian Bureau of Statistics (1983), "Australian Standard Classification of Occupations: Working Draft", AGPS, Canberra.

Dixon, P.B., Parmenter, B.R., Sutton, J. and Vincent, D.P. (1982), ORANI: A Multisectoral Model of the Australian Economy, North-Holland, Amsterdam.

Duncan, O.D. and Duncan, B. (1955), "A Methodological Analysis of Segregation Indexes", American Sociological Review, 20, April.

Haig, B.D. (1982), "Sex Discrimination in the Reward for Skills and Experience in the Australian Labour Force", Economic Record, 58, 160, March.

Jones, F.L. (1982), "Sources of Gender Inequality in Income : What the Australian Census Says", Working Paper, Research School of Social Sciences, Australian National University, Canberra.

APPENDIX A: CLASSIFICATION OF OCCUPATIONS

1	Architects, Engineers, Surveyors, Professional
2	Chemists, Physicists, Geologists & Other Physical Scientists
3	Nurses, including Probationers and Trainees
4	Medical Practitioners & Dentists
	Professional Medical Workers n.e.c.
5	Teachers
6	Law Professionals
7	Artists, Entertainers, Writers & Related Workers
8	Draftsmen and Technicians n.e.c.
9	Other Professional, Technical and Related Workers
10	Administrative and Executive Officials, Government n.e.c.
	Employers, Workers and own Account, Directors, Managers n.e.c.
11	Book-keepers and Cashiers
12	Stenographers and Typists
13	Other Clerical Workers
14	Insurance, Real Estate Salesman, Auctioneers and Valuers
15	Commercial Travellers and Manufacturers Agents
16	Proprietors, Shopkeepers, Trade, Salesmen, Shop Assistants, etc.
17	Farmers and Farm Managers
18	Farm Workers including Farm Foremen
19	Other Rural Workers
	Miners, Mineral Prospectors, Quarrymen & Related Workers
20	Road Drivers
21	Pilots, Navigators and Ships Officers
	Railway Firemen and Drivers, Guards and Conductors, Railway
	Postmasters, Postmen & Messengers
	Stationmasters, Inspectors and Supervisors, Transport
	Other Railway Workers and Traffic Controllers
	Telecommunication Workers
	Other Transport & Communication Workers
22	Spinners, Weavers, Knitters, Dyers and Related Workers
	Tailors, Cutters, Furriers and Related Workers
	Leather Cutters, Sewers & Related Workers
23	Watchmakers, Jewellers & Related Workers
24	Mechanics, Plumbers, Metal Machinists & Related Metal Workers
25	Electricians & Related Electrical & Electronic Workers
26	Metal Workers, Metal & Electrical Production-Process Workers
27	Carpenters, Cabinet Makers & Related Workers
28	Painters & Decorators
29	Bricklayers, Plasterers and Construction Workers n.e.c.
30	Compositors, Printing Machinists, Engravers & Related Workers
31	Millers, Bakers, Butchers, Brewers & Related Workers
32	Potters, Tobacco, Chemical, Sugar & Paper Production Workers
33	Paper Products, Rubber, Plastic and Production Workers
34	Stationary Engines, Excavating & Lifting Equipment Operators
35	Storemen & Freight Handlers
36	Furnacemen, Rollers, Drawers and Related workers
	Packers, Wrappers & Labellers, Laborers n.e.c.
37	Fire Brigade, Police & Other Protective Service Workers
38	Housekeepers, Cooks, Maids & Related Workers
39	Waiters, Bartenders
40	Barbers, Hairdressers & Beauticians
41	Caretakers, Cleaners of Buildings
	Launderers, Dry Cleaners & Pressers
	Athletes, Sportspersons, Undertakers and Photographers
	Service, Sport, Recreation Workers n.e.c.
42	Members of Armed Services in Australia

The rest of the paper is organized as follows: section 2 contains a brief survey of the recent literature on the male/female earnings differential. Section 3 presents an analysis of the inequality between the sexes within each of 8 occupations. Section 4 analyses the differences in the distribution of males and females across occupations. Finally, in section 5 the paper concludes with a summary of the main results and an outline of some perspectives for future research.

2 A BRIEF REVIEW OF THE LITERATURE

Two results stand out in a survey of the literature investigating the male/female earnings differential in Australia. First, holding education and experience constant, and within similar occupations, men on average earn higher hourly wages than women. Second, women tend to be employed in low status and low wage jobs, and there has been little change in this occupational distribution over this century. These results have been attributed by various authors to several factors which include, amongst others, employer discrimination, social conditioning, and utility maximization by rational individuals.

A number of studies have attempted to relate differences in earnings between the sexes to differences in their endowments of wage-determining factors; see Haig (1982), Jones (1982), Chapman (1984a), Chapman and Miller (1983), Chapman and Mulvey (1985). Their methodology involves an earnings function approach; they attempt to measure the independent contribution of a host of factors (including education and experience) to wage determination. The residual is usually taken to indicate the extent of employer discrimination.

The earnings function typically takes the following form:[2]

$$\ln W_i = a + b S_i + c EXP_i + d EXP_i^2 + f SEX_i + g Z_i + e_i , \qquad (1)$$

where for individual i, ln W is the log of wages (or earnings), S is years of schooling, EXP is length of time in the labour force, SEX is in dummy variable form, and Z is a vector of other wage-determining factors, such as occupation, industry, or region. The simple hypotheses underlying equation (1) imply that :

$$b > 0 \quad ,$$

$$c > 0 \quad ,$$

and

$$d < 0 \quad ,$$

with the coefficient f representing the residual difference between men and women. The hypotheses concerning c and d are jointly consistent with the empirical observations of concave age-earning profiles and the prediction from the human capital literature that investments in on-the-job training eventually decline as retirement approaches.[3]

All of these studies identify factors responsible for the earnings differential between males and females. They also find that productivity-related endowments only account for part of the difference. Haig (1982) finds that in 1973 on average women earned 46 per cent less wages than men. A third of this difference was attributable to

ENDNOTES

1. An edited version of this study is presented in Meagher and Dixon (1986).

2. This exposition draws on a survey of the literature by Chapman (1984b).

3. Two reasons are given for this prediction: one, that investment is less profitable as the time to recoup diminishes, and two, that the opportunity cost of investment increases with wages.

4. For a detailed discussion of these properties see Shorrocks (1980); a summary is available in the appendices to Bonnell et al. (1985) and Meagher and Dixon (1986).

5. These 8 occupations are an aggregation of the 42 occupations listed in Appendix A as follows: 1 consists of (1-9), 2 consists of (10), 3 consists of (11-13), 4 consists of (14-16), 5 consists of (17-19), 6 consists of (20-21), 7 consists of (22-36), and finally, 8 consists of (37-42).

6. The original ABS data had 62 occupational categories. However, such a disaggregation was not meaningful for our sub-population. All occupations for which the sample size for both males and females was less than 5 were aggregated with other occupations. To examine the issue of occupational segregation, however, those occupations which had a significant number of one sex, and a small number of the other, were retained individually.

Finally, this research can be extended to examine the changes which would occur in the existing distribution of income as a result of some policy or other economic change. This can be done by combining the approach used in this paper with a general equilibrium model of the Australian economy, such as ORANI (whose standard form is described by Dixon, Parmenter, Sutton and Vincent, (1982)). Such a combined model could be used to calculate the changes in the levels of employment and incomes which would occur due to, say, a terms of trade deterioration such as the one Australia has experienced recently. This change in the relative prices of traded goods is likely to depress the export-producing industries and stimulate the import-competing ones. It is also likely to alter the relative distribution of income between males and females since they have such different occupational/industrial attachments. For example, by referring to Table 5, we see that males are predominant in the agricultural industries (which are major exporters), while women are predominant in textile, clothing and footwear manufacturing (which are import-competing). It should be noted, again, that additional assumptions need to be made before we can draw any welfare conclusions from this type of analysis.

disparities between the sexes in their years of schooling, tertiary qualifications, and amount of work experience (proxied by age). The remaining two-thirds Haig attributes to discrimination.

Similarly, Jones (1982) identifies factors which explain about 50 per cent of the observed earnings differential between the sexes. He finds that differences in the following contribute to the inequality in male/female incomes: number of hours worked (24 per cent), occupational distribution (16 per cent), and labour force experience (9 per cent) (as proxied by the formula: age minus years of schooling minus 5). These factors still fail to explain about 50 per cent of the original earnings differential.

Chapman and Miller (1983) examine the effect of differences in occupation and industry groups (among other factors) on differences in earnings between the sexes. Their study identifies 140 separate industry-occupation groups in an effort to account for job differences. They find that there are significant variations in the returns to education and experience across jobs. Hence, differences in occupational distributions between males and females will cause differences in their earnings. Their study confirms the results of the other studies; they find that for each industry and occupation (holding constant education, experience and tertiary qualifications) males receive higher hourly wages than females.

Chapman (1984a) examines wages of persons employed in the clerical/administrative division of the Australian Public Service. He

also identifies education and experience as two factors which partly explain the differential in the incomes of the sexes. He finds, however, that even within such a narrowly defined, relatively homogeneous group, males have an 'unexplained' earnings advantage of the order of 6 per cent over women.

Chapman and Mulvey (1985) examine the contribution of a number of other factors, such as geographical location and various demographic characteristics, to the male/female earnings differential. They find that industry, occupation, marital status, union status, country of birth and geographic location do not change the average wage differential between the sexes. The returns to the endowments of skill and experience are greater for males than females irrespective of whether or not these other characteristics are taken into account.

A number of other studies examine the effect of the different occupational distributions of males and females on their incomes. Instead of using the 'earnings function' approach to test whether males and females earn differing amounts within the same occupations, these studies examine the nature of the occupational distribution of each sex. Such examinations typically reveal that men and women are employed in very different jobs -- a phenomenon referred to as 'job segregation' in the literature. This phenomenon has been identified as one of the most important reasons why women earn less than men; they tend to be employed in lower status and lower paid jobs.

Figure 1, i.e. by selecting populations different to those chosen in shis study. For example, to investigate whether rates of promotion differed between the sexes, we could select older populations and examine whether the male/female wage differential changed significantly from that observed for the 20-29 year-olds in this study.

Another fruitful area of research would be to examine more closely whether the rates of return to similar skills varied depending upon certain characteristics of the possessor of these skills. These characteristics could include sex, race, country of birth, etc. Such research, however, must necessarily await the availability of occupational classifications based on relatively homogeneous skill levels. Data satisfying this requirement are soon to be available from the proposed Australian Standard Classification of Occupations.

A further extension of this research would be to do welfare analysis, i.e., to examine the inequalities in the distribution of welfare (rather than income or wages) between the sexes. To do convincing work in this area would obviously require data (and models) on intra-household transfers). No attempt has been made in this paper to draw any welfare conclusions. It is recognized that while income might be an adequate indicator of welfare for some groups of individuals, for others it would be a meaningless one. For example, it would be senseless to make welfare comparisons between full-time workers and those not in the labour force on the basis of their incomes.

Points worthy of highlighting are:

(1) A significant proportion of the inequality between the incomes of the sexes can be explained by the differences in their respective labour force status, number of hours worked, education and work experience. Adjustment for these factors increases the ratio of the average female to the average male income from 48 per cent to 86 per cent.

(2) While the unexplained differential noted in (1) suggests the possible existence of some wage discrimination against females, the main source of the very substantial differences in the incomes of the sexes is their strong occupational stereotyping. For example, a detailed examination of 42 occupations revealed that more than 45 per cent of 20-29 year old currently employed full-year full-time female workers with post-school qualifications worked in just 3 occupations: teachers, nurses, and stenographers and typists. These 3 occupations only accounted for about 6 per cent of the corresponding group of males.

There are several directions in which this research can be extended, some of which are listed below. Firstly, several interesting issues relating to income distribution can be examined by selecting alternative paths along the branching classification outlined in

Lewis (1982) calculates various occupational and industrial segregation indices which measure the degree of job segregation between the sexes in Australia. He finds a high degree of segregation in the economy today; about 60 per cent of the male (female) workforce would have to change occupations if they are to have the same occupational distribution as the female (male) workforce. He finds that though segregation by sex has declined over this century, the rate of decline is slowing down. Substantial changes in segregation before the year 2001 are therefore unlikely to occur if past trends continue.

Haig (1982) also examines the issue of occupational segregation and confirms that men and women in Australia tend to be employed in very different jobs. For example, he finds that in 1973, one-third of working women were in jobs that contained less than 2 per cent of the male workforce, and 80 per cent were in jobs that employed 25 per cent of working males. 75 per cent of men were in jobs which employed 10 per cent of the female workforce. Such data clearly reveal differences in the nature of jobs in which men and women are employed.

The above studies help to identify some of the important factors causing inequalities in the incomes of the sexes. The main factors identified as sources of inequality are differences in: (1) labour force status; (2) number of hours worked, (3) educational qualifications, (4) experience and, (5) occupational-industrial attachment. These factors will be used in this study to explain a significant proportion of the observed earning differential between the sexes.

3 INEQUALITY WITHIN AN OCCUPATION

3.1 Methodology

This study uses a decomposition strategy (instead of regression analysis) to examine in turn the contribution of various factors to male/female income inequality. The factors have been previously identified from a survey of the literature and include: labour force status, number of hours worked, educational qualifications, experience and occupation. The decomposition strategy involves successively removing from our population, persons who differ with respect to each of these characteristics and then decomposing the inequality in the remaining sub-population into inequality within each sex and inequality between the sexes. This process helps isolate the effect of each characteristic on male/female inequality.

This decomposition procedure is analogous to selecting a path in a branching classification which moves to successively more and more homogeneous groupings. Figure 1 gives a simplified account of the path selected in this study. Other paths, of course, could have been selected. However, for reasons stated below, the selection made here is a natural starting point for research.

Table 6

PATTERN OF OCCUPATIONAL SEGREGATION

	Jobs Most Dominated by Males (a)	Mean Income of Males	Jobs Most Dominated by Females (a)	Mean Inco of femal
1	Mechanics, Plumbers, etc.	15887	Other Clerical Workers	12612
2	Electricians, etc.	16974	Teachers	17258
3	Carpenters, etc.	14549	Nurses	14547
4	Bricklayers, Plasterers, etc.	13984	Stenographers and Typists	12723
5	Administrative, Executive,etc.	18116	Service, Sport, Recreation n.e.c.	11806
6	Architects, Engineers, etc.	21529	Barbers, Beauticians	11107
7	Road Drivers	14535	Waiters, Bartenders	13199
8	Farmers and Farm Managers	12891	Proprietors, Shopkeepers, etc.	11011
9	Millers, Bakers, etc.	13869	Artists, Entertainers, etc.	15693
10	Lifting Equipment Operators	17100	Housekeepers, Cooks, etc.	10888

(a) In the left half of the table, occupations are listed in descending order of (Mi-F (from Table 5); in the right half of the table, they are listed in ascending order

for 16.2 per cent of the male workforce, while these occupations account for less than 0.4 per cent of the female workforce.

Table 6 presents a list of the 10 most 'male-dominated' (highest $M_i - F_i$) and the 10 most 'female-dominated' (lowest $M_i - F_i$) occupations. The table reveals that there are systematic differences in the nature of occupations in which males and females are employed. In particular, men are concentrated in trade-related blue-collar jobs while women are predominant in service-oriented white-collar jobs. In addition, the female-dominated jobs tend to pay lower wages, on average, than the male dominated ones. This can be assessed by looking at Table 6 which reveals that in six of the ten occupations in which women are clustered, they receive less income than the lowest-paying of the ten occupations in which men are clustered. The table thus confirms that women, on average, tend to be employed in lower-paying jobs than men.

5 CONCLUSION AND PERSPECTIVE FOR FUTURE RESEARCH

This paper examines the influence of various factors which have been identified as sources of inequality between male and female incomes in Australia. It presents evidence which confirms two results from earlier studies in this area: first, that holding constant education and work experience, men on average earn higher hourly wages than women; and second, that men tend to be employed in higher paying jobs than women. The novelty of the present paper is that these conclusions are confirmed from the examination of a single data source whose availability on a unit record basis has no Australian precedent.

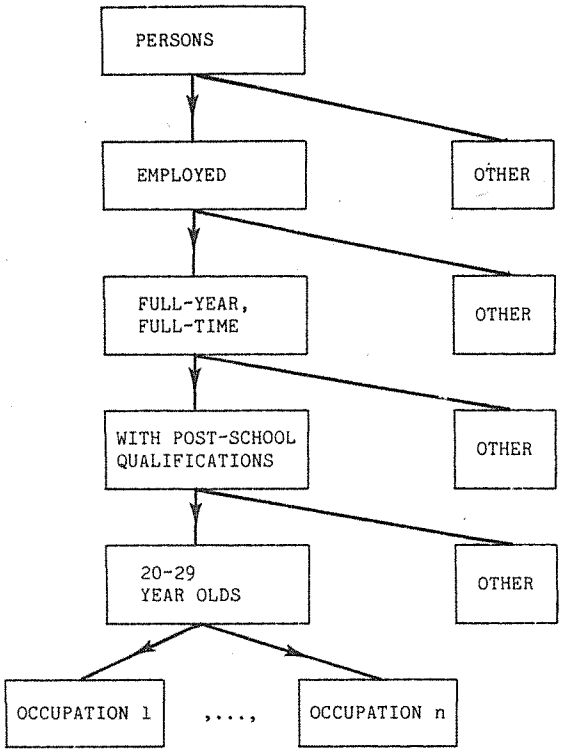

FIGURE 1 SIMPLIFIED ACCOUNT OF DECOMPOSITION PROCEDURE

At the lowest level of the decomposition process, the population remaining is relatively homogeneous with respect to labour force participation and endowments of various productivity-related characteristics. This homogeneous sub-population is then further classified into 8 occupations, and the degree of inequality between the sexes in each of these occupations is examined.

The inequality between males and females, at each level of analysis, is measured using the Shorrocks I_0 index (Shorrocks 1980). This index was first proposed by Theil (1967), and more recently was shown by Shorrocks (1980) to belong to a class of additively decomposable indices which uniquely satisfy certain desirable properties.[4]

The Shorrocks I_0 index measures inequality according to the formula :

$$I_0(y) = \frac{1}{n} \sum_i \log \left(\frac{u}{y_i}\right) , \qquad i=1,\ldots, n \quad , \quad (2)$$

where $y = (y_1,\ldots, y_n)$ is the income vector for a population of n individuals, u is the mean income of the population, and y_i is the income of individual i. If there were no inequality in the population, (i.e., if all the ratios of individual incomes to the mean income of the population were one) then the I_0 would have the value zero. Otherwise, I_0 will be positive, with higher values indicating increasingly unequal distributions.

income than females in all except 6 of the occupations. In those 23 where the males have an advantage over the females, the income differential ranges from 2 per cent in 'Artists, Entertainers, etc.' to 489 per cent in 'Farmers and Farm Managers'. Thus males, on an average, receive more income than females - both in male-dominated as well as in female-dominated occupations. For example, in occupations such as 'Teachers' or 'Nurses', which employ a significantly greater proportion of the female workforce as compared to the male workforce, the average male worker still receives more than the average female worker. The same is true for male-dominated occupations such as 'Administrative and Executive', and 'Draftsmen and Technicians'.

Turning next to the issue of differences in the occupational patterns of males and females, we find that there is a high degree of occupational segregation in the workforce. The Duncan and Duncan index of occupational segregation, S, has a value of 68 for the fairly homogeneous population underlying Table 5. This measure implies that 68 per cent of either sex would have to change their occupation in order to achieve an occupational distribution which does not differ between sexes. The existence of a high degree of occupational segregation in the population can be further confirmed by looking at the pattern in some of the occupations. For example, 3 occupations - 'Nurses', 'Teachers', and 'Stenographers and Typists' account for over 45 per cent of the female workforce, while these same occupations account for only 6 per cent of the male workforce. Similarly, 'Mechanics and Plumbers', 'Electricians', 'Carpenters' and 'Bricklayers and Plasterers' account

TABLE 5

OCCUPATIONAL DISTRIBUTION OF 20-29 YEAR OLD FULL-YEAR FULL-TIME EMPLOYED WORKERS WITH POST-SCHOOL QUALIFICATIONS

	Occupation[a]	Number		Mean Incomes (dollars)		Ratio of Male/Female Mean Incomes	Segregation Measure M_i-F_i (per cent)
		Males	Females	Males	Females		
1	Architects, Engineers, etc.	10066	279*	21529	17250	1.25	2.5
2	Physical Scientists	1913	1669*	21023	20301	1.04	-0.4
3	Nurses	2722	24416	17491	14547	1.20	-12.8
4	Other Medical Workers	4045	2692	18638	19525	.95	-0.4
5	Teachers	22009	36802	18638	17258	1.08	-14.6
6	Law Professionals	3595	482*	32169	28100	1.14	0.7
7	Artists, Entertainers, etc.	1933	1974	15947	15693	1.02	-0.6
8	Draftsmen, Technicians n.e.c.	13108	3573	18043	15035	1.20	1.5
9	Other Professional Workers	17621	8631	19618	17793	1.10	-0.1
10	Administrative, Executive, etc.	17700	2595	18116	13775	1.32	3.2
11	Book-keepers and Cashiers	3909	2304	14106	10784	1.31	-0.2
12	Stenographers and Typists	0	20625	0	12723	-	-11.4
13	Other Clerical Workers	18075	43619	17014	12612	1.35	-19.4
14	Insurance, Real Estate, etc.	3895	0	19029	0	-	1.0
15	Commercial Travellers	2487	1694*	16488	12213	1.35	-0.3
16	Proprietors, Shopkeepers, etc.	7118	4621	16264	11011	1.48	-0.7
17	Farmers and Farm Managers	9077	762*	12891	2188	5.89	2.0
18	Farm Workers	7045	247*	10017	13396	0.75	1.7
19	Other Rural Workers, Miners	3179	0	16732	0	-	0.8
20	Road Drivers	8839	0	14535	0	-	2.3
21	Other Transport, Communication Workers	4378	748*	18016	13303	1.35	0.7
22	Textile, Clothing and Footwear Workers	2430	1781	11271	11331	.99	-0.3
23	Watchmakers, Jewellers	4939	722*	15841	13298	1.19	0.9
24	Mechanics, Plumbers, etc.	76905	404*	15887	11169	1.42	20.1
25	Electricians, etc.	35260	252*	16974	10659	1.59	9.2
26	Metal Workers	4787	0	10599	0	-	1.3
27	Carpenters, etc.	18911	0	14549	0	-	5.0
28	Painters and Decorators	4756	0	12959	0	-	1.3
29	Bricklayers, Plasterers, etc.	13044	0	13984	0	-	3.4
30	Compositors, etc.	5660	939*	16918	14213	1.19	1.0
31	Millers, Bakers, etc.	7477	0	13869	0	-	2.0
32	Tobacco Workers, etc.	2016	369*	16758	6940	2.41	0.3
33	Rubber, Plastic Workers, etc.	1327	0	17236	0	-	0.4
34	Lifting Equipment Operators	6748	220*	17100	22300	0.77	1.7
35	Storemen, Freight Handlers	3968	0	14032	0	-	1.0
36	Production Process Workers n.e.c.	4487	0	13339	0	-	1.2
37	Protective Services Workers	6136	446*	19452	18150	1.07	1.4
38	Housekeepers, Cooks, etc.	3128	2564	17483	10888	1.61	-0.6
39	Waiters, Bartenders	345*	2517	12759	13199	0.97	-1.3
40	Barbers, Beauticians	0	4183	0	11107	-	-2.3
41	Service, Sport, Recreation n.e.c.	6400	7404	13724	11806	1.16	-2.4
42	Members of Armed Services	6784	901*	18638	20125	0.93	1.3
	Total	378222	180435	16542	14255	1.16	(b)

(a) A more detailed listing of each occupation is provided in Appendix A.

(b) The sum of the absolute values in this column is 168, which is twice the value of the Duncan and Duncan index -- see equation (4).

* These numbers are based on very small samples.

The Shorrocks I_0 index possesses the following properties:

(a) The inequality measure for the population as a whole is expressible as the sum of a "within groups" term and a "between groups" term.

(b) The "within groups" term is expressible as a weighted sum of the inequality measures constructed for each of the groups treated as a population in its own right, where the weights are proportional to the number of individuals in each group.

With such an index, total inequality in the population can be decomposed as follows:

total inequality (3)

= contribution of inequality among males

\+ contribution of inequality among females

\+ contribution of inequality between males and females.

The Shorrocks I_0 index is used in this study to implement (3).

A natural measure of the inequality between the sexes can be obtained by calculating the index which would apply if all male incomes were equalized at the male mean and all female incomes were equalized at the female mean. In this situation, the only inequality remaining in the population would be that between the sexes. This is one way in which the between-group Shorrocks can be calculated.

An alternative approach to measuring the between-group contribution is to compute the reduction in the index for the population which would occur if each individual's income for each sex was scaled up or down so that male and female group means were equalized at the population mean. In the resulting distribution, inequality between the sexes would be eliminated while the inequalities within each sex would be maintained at their initial levels. One advantage of using Shorrocks' index (2) is that of the class of indices proposed by him, only I_0 has the property that these two alternative approaches to the measurement of the contribution of the between-group inequality to total inequality give the same answers (Shorrocks, 1980).

In implementing the decomposition sketched in Figure 1, the various sub-populations are selected according to the population hierarchy set out in Figure 2. At the topmost level is the population of all income recipients.

The characteristic used to select the population for the next round of analysis, henceforth referred to as the selection characteristic, is labour force status. All income recipients can be divided into three categories with respect to their labour force status: employed, unemployed, and not in the labour force. For this analysis, only those employed are selected, and subdivided into males and females.

where N is the number of occupations, M_i is the percentage of the total male labour force employed in the i^{th} occupation, and F_i is similarly defined for females. If there is no occupational segregation, i.e., if males and females are equally represented (as a proportion of their respective labour forces) in each occupation, then the value of the index S equals zero; higher values of S imply a correspondingly greater degree of occupational segregation.

The value of S, the index of occupational segregation, is calculated for the fifth level population of Figure 2, i.e. for the 20-29 year-old full-year full-time employed workers with post-school qualifications. In doing so, the value of $(M_i - F_i)$ for each of 42 occupations is calculated. This helps identify 'male dominated' $(M_i - F_i > 0)$ versus 'female dominated' $(M_i - F_i < 0)$ occupations, and enables us to examine whether the income differential between the sexes can be partially explained by women being clustered in lower-paying jobs.

4.2 Results

Table 5 contains some summary statistics, including the values of $(M_i - F_i)$ for the detailed classification of 42 occupations.[6] First we look at the differences in the male/female income ratio within each occupation. Out of the 42 occupations, 13 are totally segregated by sex. Of these totally segregated occupations, 11 employ only men, while 2 employ only women. Thus women are employed in a smaller range of occupations. In the remaining 29 mixed occupations, males receive more

of occupations rather than the narrowly defined one in the Chapman study.

The results at the sixth level show that in each of the occupations for which we have reliable estimates, males on average earn higher hourly wages than do comparable females. The wage differentials are higher than the income differentials in some occupations and lower in others. Too much emphasis should not be placed on analysing the results at level 6, however, because of the problems noted earlier with the current occupational classifications.

4 DIFFERENCES IN OCCUPATIONAL DISTRIBUTIONS

4.1 Methodology

The difference between the occupational patterns of males and females has been identified in the literature as one of the most important causes of their income inequality. Women, typically, have been found to be concentrated in lower status and lower paying jobs than men. Several attempts have been made to measure the degree of occupational segregation of males and females. One of the most common measures used for this purpose was first proposed by Duncan and Duncan (1955). Their index of occupational segregation, S, is:

$$S = \frac{1}{2} \sum_{i=1}^{N} | M_i - F_i | \quad , \qquad (4)$$

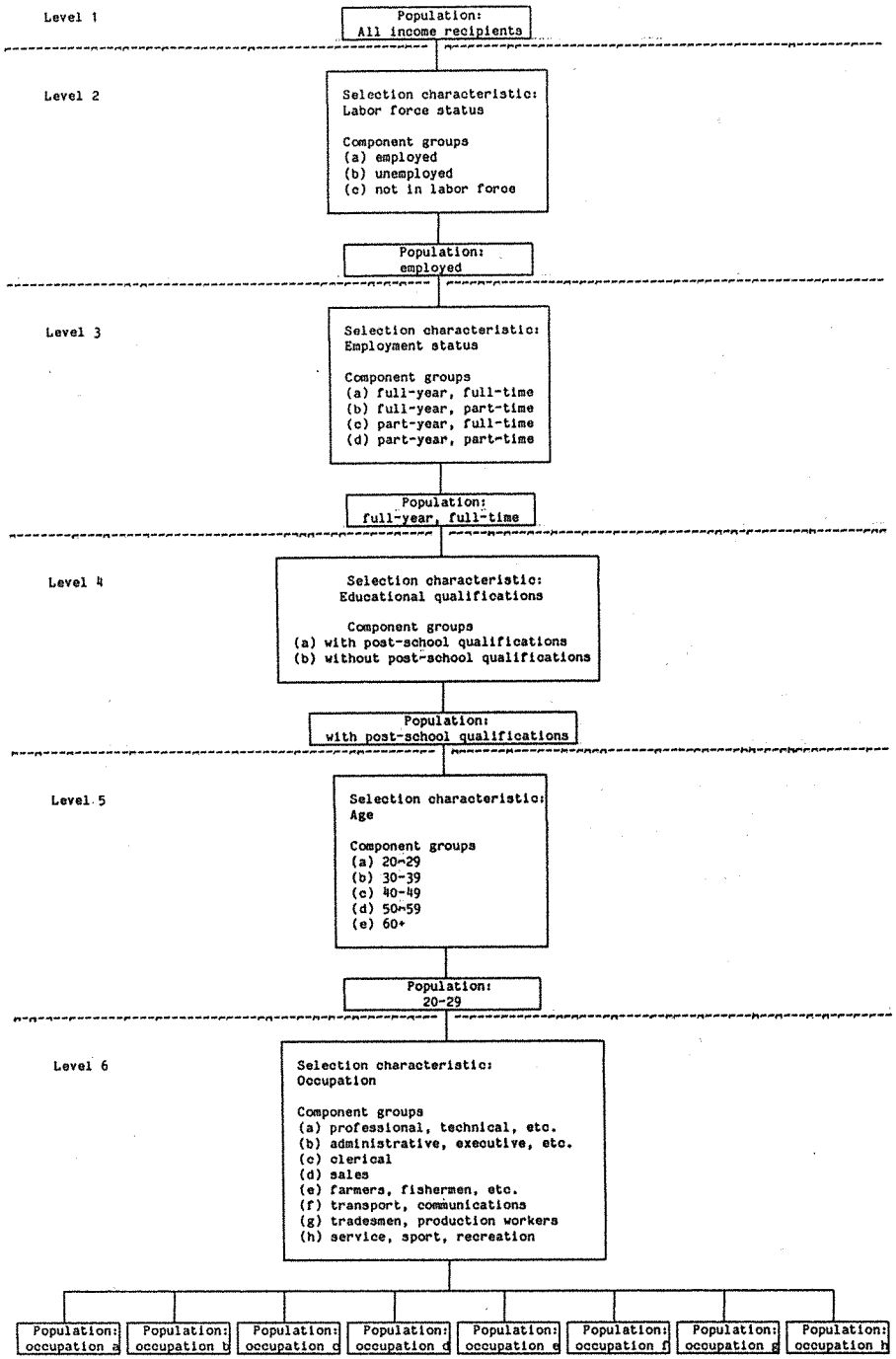

FIGURE 2 THE POPULATION HIERARCHY

The Shorrocks index is used to decompose the inequality in this population into a within-group and a between-group measure.

At the third level, the differences in the number of hours worked by each sex are accounted for. The selection characteristic used this time is employment status: full-year full-time, full-year part-time, part-year full-time and part-year part-time. Only the full-year full-time workers are selected for the next round. They are selected because, of the 4 categories, they represent the largest number of workers for both males and females. Again, the degree of inequality between the sexes is measured as before.

At the fourth level, the effect of education on income is taken into account. The selection characteristic at this level is educational qualifications. The population can be subdivided into those with and without post-school qualifications. Only those with post-school qualifications are selected. The reason, again, is because they represent the majority of full-year full-time workers for both the sexes. Inequality measures are computed for this sub-group.

At the fifth level, the contribution of experience to income is accounted for. Unfortunately, no data is available on the number of years spent in the labour force by each person, and hence it is impossible to measure experience directly. The methods adopted in some other studies (see, for example, Haig (1982)) can be used where age is a proxy for experience. There are, however, certain limitations of this measure that need to be identified. For example, it does not take into

Table 4

WAGE DIFFERENTIALS BETWEEN MALES AND FEMALES

Level(a)	Population	Mean Wages			Ratio of Male/ Female Mean Wages
		Male	Female	Total	
1	All income recipients	10528	3961	7316	2.66
2	All employed income recipients	13224	8219	11434	1.61
3	All employed FY-FT income recipients(b)	14332	11669	13666	1.23
4	All employed FY-FT income recipients with post-school qualifications	16167	14031	15720	1.15
5	All 20-29 year old employed FY-FT income recipients with post-school qualifications	14593	13713	14309	1.06
6	Occupations				
6.1	Professional, Technical	17907	16043	16954	1.12
6.2	Administrative, Executive	14115	12208	13871	1.16
6.3	Clerical	16194	12185	13181	1.33
6.4	Sales	14710	11227	13600	1.31
6.5	Farmers, Fishermen, etc.	7035	3148*	6842	2.23*
6.6	Transport, Communications	12341	13185*	12386	0.94*
6.7	Tradesmen, Production workers	13760	12154	13721	1.13
6.8	Service, Sport, Recreation	16911	11052	14325	1.53

(a) The level refers to the level in the population hierarchy of Figure 2.

(b) FY - FT = full year, full-time.

* These numbers are based on very small samples.

as wages and salaries and exclude the rest. Inequalities in this source of income are then examined and the results reported in Table 4.

In comparing Tables 3 and 4 we find that, at the initial level, the wage differential between the sexes is higher than their income differential. This reflects the fact that the proportion of a sex not in the labour force, is higher for women than for men. At the second level as well, the differential between the sexes is greater in Table 4. This can be explained by the fact that a significantly higher proportion of women work in part-time (and part-year) jobs, and hence examining only wage income (instead of total) income magnifies the inequalities between the sexes. At the third level we find that the inequality between the sexes is smaller in Table 4; there is a 23 per cent difference in their wages as compared to a 33 per cent difference in their incomes. This result suggests that for this population, wages are distributed more equally between the sexes than are other types of incomes. This is also true at the next level; the wage differential (15 per cent) is smaller than the income differential (28 per cent). Finally, for the relatively homogeneous population of level 5, we find that the wage differential between the sexes is quite small; only 6 per cent as compared to an income differential of 16 per cent. This result is interesting because this wage differential is of the same magnitude as that calculated by Chapman (1984a) in his study of the relative wages of the sexes in the clerical/administrative division of the Australian Public Service. What is remarkable is that these numbers are the same even though the relevant population in this paper covers a wide spectrum

account the differences in the number of years spent in attaining post-school qualifications by people of the same age. Further, and even more important for this study, it does not take into account the difference between the sexes in the continuity of their labour force participation. Married women, especially, are more likely to have a discontinuous history of employment than men, for the obvious reasons associated with child bearing and raising. This systematic bias introduced by using age as a proxy for experience, can be reduced to a certain extent by selecting a younger population. For this reason, the population for the next round of analysis consists of 20-29 year old people only. The number of women who have withdrawn from, and returned to, the labour force will be smaller than in an older sample, say of the 30-40 year old group.

After this process in completed, a relatively homogeneous population of 20-29 year old, currently employed, full-year full-time workers with post-school qualifications remains. By successively excluding persons from our analysis who differ with respect to various income-determining factors, it can be expected that the major sources of inequality in the incomes of the sexes have been eliminated.

For the final step, this new homogeneous sub-population is classified into 8 occupational categories.[5] The male/female income differential in each of these occupations can then be measured. Ideally, we would like these occupations to be homogeneous with respect to skill requirements so that earnings within an occupation reflect the returns to a particular skill level. Unfortunately, however, the ABS

occupation groups are defined primarily on an industry basis and contain widely different jobs involving different skill levels (Craigie, 1979). As pointed out in the critical Crawford Report (1979), the ABS occupational classification "is not skill oriented and in many cases occupations which require little or no skill are lumped together with highly skilled occupations under one heterogeneous occupational category". The new Australian Standard Classification of Occupations (ASCO), which is currently being prepared jointly by the Department of Employment and Industrial Relations (DEIR) and the ABS (see, ASCO: Working Draft, 1983), seeks to overcome some of the shortfalls of the current occupational classifications. Until then, however, we are forced to use the existing inadequate classifications.

3.2 Results

Table 1 contains the main results of the study on the sources of inequality between male and female incomes in Australia. The results are arranged according to the structure of the population hierarchy of Figure 2.

The degree of inequality represented by the values of the Shorrocks I_0 index in Table 1 can be understood better with the help of Table 2 which shows the values of the I_0 index for a series of hypothetical two-person populations together with the corresponding income share of the richer person. In Table 1 we see that the value of I_0 for the distribution of incomes of all income recipients is 0.476.

occupations is examined. In each of the eight occupations, this gap actually goes up. It is greater than 16 per cent in every one of them, and its reliable estimates range from 19 per cent in 'Professional, Technical' to a high of 51 per cent in 'Sales'.

This seemingly counter-intuitive result arises due to two reasons. The first, as explained earlier, is because the occupational classifications used are industry-based and not skill-based and hence consist of a wide range of persons with varying skill levels and earning capacities. The second is due to the significant differences in the occupational distribution of the sexes. For example, suppose in a hypothetical society of a 100 males and a 100 females, 80 females and 2 males worked as nurses, and the rest were distributed across other professions. Then, if nurses, on average, earned an income close to the population mean, but the 2 male nurses earned significantly higher incomes than the female nurses, a situation as above would result; the male/female earning differential would be higher within an occupation than in the economy as a whole. This result highlights the differences in the occupational distribution of the sexes, and re-emphasizes the need to examine it in greater detail.

Table 3 examines the income differential between the sexes. To investigate whether males on average earn higher hourly wages than comparable women, we need to examine instead the wage differential between the sexes. The IHS data base identifies 23 different sources of income. For our purpose, we select only the income individuals receive

Table 3

INCOME DIFFERENTIALS BETWEEN MALES AND FEMALES

Level[a]	Population	Mean Incomes			Ratio of Male/ Female Mean Incomes
		Male	Female	Total	
1	All income recipients	14078	6721	10479	2.09
2	All employed income recipients	16451	10332	14262	1.59
3	All employed FY-FT income recipients[b]	17459	13144	16380	1.33
4	All employed FY-FT income recipients with post-school qualifications	19482	15182	18582	1.28
5	All 20-29 year old employed FY-FT income recipients with post-school qualifications	16542	14255	15804	1.16
6	Occupations				
6.1	Professional, Technical	19721	16560	18106	1.19
6.2	Administrative, Executive	18116	13775	17561	1.32
6.3	Clerical	16497	12583	13555	1.31
6.4	Sales	17103	11333	15264	1.51
6.5	Farmers, Fishermen, etc.	12475	4932*	12100	2.52*
6.6	Transport, Communications	15688	13303*	15560	1.18*
6.7	Tradesmen, Production workers	15478	12331	15404	1.26
6.8	Service, Sport, Recreation	17230	12281	15045	1.40

(a) The level refers to the level in the population hierarchy of Figure 2.

(b) FY - FT = full year, full-time.

* These numbers are based on very small samples.

Table 1

SOURCES OF INEQUALITY BETWEEN MALE AND FEMALE INCOMES

Level[a]	Population	Components Groups	Number (thousands)	Shorrocks I_0 Indexes		Contribution per cent[d]
				(Unweighted)[b]	Weighted[c]	
1	All individual income recipients	Males	5052	0.269	0.137	28.9
		Females	4837	0.556	0.272	57.1
		Within groups			0.409	86.0
		Between groups			0.067	14.0
		Population	9889	0.476	0.476	100.0
2	All employed income recipients	Males	3815	0.181	0.116	49.8
		Females	2125	0.262	0.094	40.1
		Within groups			0.210	89.9
		Between groups			0.023	10.1
		Population	5940	0.233	0.233	100.0
3	All employed full-year full-time income recipients	Males	3182	0.148	0.111	74.2
		Females	1061	0.125	0.031	21.0
		Within groups			0.142	95.2
		Between groups			0.007	4.8
		Population	4243	0.149	0.149	100.0
4	All employed full-year full-time income recipients with post-school qualifications	Males	1638	0.139	0.110	81.2
		Females	434	0.098	0.021	15.2
		Within groups			0.131	96.4
		Between groups			0.005	3.6
		Population	2072	0.136	0.136	100.0
5	All 20-29 year old employed full-year full-time income recipients, with post-school qualifications	Males	378	0.118	0.080	81.2
		Females	181	0.050	0.016	16.4
		Within groups			0.096	97.6
		Between groups			0.002	2.4
		Population	559	0.098	0.098	100.0

..continued

Table 1 (continued)

Level[a]	Population	Components Groups	Number (thousands)	Shorrocks I_0 Indexes (Unweighted[b])	Shorrocks I_0 Indexes (Weighted[c])	Contributions (per cent[d])
6	Occupation					
6.1	Professional, Technical	Males	77	0.077	0.037	64.1
		Females	81	0.034	0.017	29.4
		Within groups			0.054	93.5
		Between groups			0.004	6.5
		Population	158		0.058	100.0
6.2	Administrative, Executive	Males	18	0.205	0.180	95.4
		Females	2	0.037	0.004	2.5
		Within groups			0.184	97.9
		Between groups			0.004	2.1
		Population	20	0.188	0.188	100.0
6.3	Clerical	Males	22	0.032	0.008	23.6
		Females	67	0.025	0.018	55.1
		Within groups			0.026	78.7
		Between groups			0.007	21.3
		Population	89	0.033	0.033	100.0
6.4	Sales	Males	14	0.041	0.029	43.0
		Females	6	0.060	0.018	29.9
		Within groups			0.047	72.9
		Between groups			0.017	27.1
		Population	20	0.064	0.064	100.0
6.5	Farmers, Fishermen, etc.	Males	19	0.435	0.413	88.6
		Females*	1	0.759	0.038	8.1
		Within groups			0.451	96.7
		Between groups			0.016	3.3
		Population	20	0.467	0.467	100.0
6.6	Transport, Communications	Males	13	0.032	0.030	95.9
		Females*	1	0.012	0.001	1.9
		Within groups			0.031	97.8
		Between groups			0.001	2.2
		Population	14	0.032	0.032	100.0
6.7	Tradesmen, Production workers	Males	193	0.111	0.108	98.8
		Females	5	0.030	0.001	0.6
		Within groups			0.109	99.4
		Between groups			0.001	0.6
		Population	198	0.110	0.110	100.0
6.8	Service, Sport, Recreation	Males	23	0.059	0.033	45.3
		Females	18	0.058	0.025	35.4
		Within groups			0.058	80.7
		Between groups			0.014	19.3
		Population	41	0.072	0.072	100.0

(a) The level refers to the level in the population hierarchy of Figure 2.

(b) These indexes treat the group identified at left as a population in its own right.

(c) Weights are proportional to numbers of individuals.

(d) Calculated from previous column.

* Numbers relating to these groups are based on very small samples.

these results are dependent on the particular pathway selected for moving through the classification.

At the sixth level, the population of level 5 is subdivided into eight occupations. There is no systematic reduction in inequality. In Table 1 the between-groups Shorrocks rises in some occupations and falls in others. These results re-emphasize the need to use skill-based rather than industry-based occupational classifications. Given the wide range of skills that are clustered together in each of these occupations, there is no reason to expect that different workers in the same occupation would receive the same returns. The numbers of males and females in each occupation reveal that the occupational patterns of the sexes are quite different. This issue is dealt with below.

Table 3 presents the same analysis in terms of mean incomes of males, females, and the total population at each level of hierarchy. It also presents the ratio of male to female mean income at each level. We see that at the initial level, the average male receives more than twice the income of the average female. This differential is reduced to 59 per cent when the difference in the labour force participation of the sexes is taken into account. Accounting for the differences in the number of hours worked by males and females further reduces this differential to 33 per cent. Removing educational differences reduces the income gap to 28 per cent. The gap is further reduced to 16 per cent by eliminating some of the differences in the levels of experience of the sexes. Finally, the male/female income differential in eight

inequality between the incomes of the sexes falls, as reflected in the fall in the between-groups Shorrocks from 0.007 to 0.005. This implies that removing the income differences within each sex would reduce the level of inequality to one where the richer person, in a two-person world, received 55 per cent of the total income. At this level, the inequality between the sexes contributes only 3.6 per cent to total inequality in the population. Thus, relative to the path identified in Figure 1, this analysis identifies educational differences between the sexes as a relatively minor factor causing differences in their incomes.

The fifth level contains only the 20-29 year-olds from the population of level 4. As explained above, age is used as a measure of experience for lack of better data. Differences in the levels of experience of the sexes now emerges as a further contributor to their income differential. Total inequality in the population falls, with the inequality between the sexes falling further. The between-group measure of inequality falls from 0.005 to 0.002, reflecting a not-so-unequal society with the richer person receiving 53.5 per cent of the total income. Most of the inequality at this level is caused by inequality within the members of each sex; only 2.4 per cent of total inequality is caused by male/female income differences.

Clearly, the above hierarchical decomposition, by systematically taking account of various productivity-related differences between the sexes, enables a significant proportion of their initial income differential to be explained. As noted above, however,

Table 2

AN AID FOR INTERPRETING THE SHORROCKS I_0 INDEX[(a)]

(1) I_0 Index	(2) Richer person's share (%)	(1) I_0 Index	(2) Richer person's share (%)	(1) I_0 Index	(2) Richer person's share (%)	(1) I_0 Index	(2) Richer person's share (%)	(1) I_0 Index	(2) Richer person's share (%)
0.0000	50.0	0.0204	60.0	0.0872	70.0	0.2231	80.0	0.5108	90.0
0.0001	50.5	0.0226	60.5	0.0920	70.5	0.2327	80.5	0.5337	90.5
0.0002	51.0	0 0248	61.0	0.0970	71.0	0.2426	81.0	0.5580	91.0
0.0005	51.5	0.0272	61.5	0.1022	71.5	0.2528	81.5	0.5838	91.5
0.0008	52.0	0.0297	62.0	0.1076	72.0	0.2635	82.0	0.6114	92.0
0.0013	52.5	0.0323	62.5	0.1131	72.5	0.2745	82.5	0.6410	92.5
0.0018	53.0	0.0350	63.0	0.1189	73.0	0.2860	83.0	0.6728	93.0
0.0025	53.5	0.0378	63.5	0.1248	73.5	0.2979	83.5	0.7071	93.5
0.0032	54.0	0.0408	64.0	0.1309	74.0	0.3130	84.0	0.7445	94.0
0.0041	54.5	0.0439	64.5	0.1373	74.5	0.3232	84.5	0.7853	94.5
0.0050	55.0	0.0472	65.0	0.1438	75.0	0.3367	85.0	0.8304	95.0
0.0061	55.5	0.0505	65.5	0.1506	75.5	0.3507	85.5	0.8804	95.5
0.0073	56.0	0.0540	66.0	0.1576	76.0	0.3653	86.0	0.9367	96.0
0.0085	56.5	0.0576	66.5	0.1649	76.5	0.3806	86.5	1.0009	96.5
0.0099	57.0	0.0614	67.0	0.1724	77.0	0.3966	87.0	1.0754	97.0
0.0114	57.5	0.0653	67.5	0.1801	77.5	0.4133	87.5	1.1639	97.5
0.0130	58.0	0.0694	68.0	0.1881	78.0	0.4309	88.0	1.2730	98.0
0.0147	58.5	0.0736	68.5	0.1964	78.5	0.4493	88.5	1.4142	98.5
0.0165	59.0	0.0780	69.0	0.2050	79.0	0.4688	89.0	1.6144	99.0
0.0184	59.5	0.0825	69.5	0.2139	79.5	0.4892	89.5	1.9585	99.5

(a) This table shows the values of the Shorrocks I_0 index for a population of two people in which the richer person's share of total income is that shown in column (2). For example, if the Shorrocks I_0 index is 0.078 then the richer person has 69 per cent of total income.

By referring to Table 2, we can see that this level of inequality is equivalent to that which would exist in a two-person population in which the richer person had about 89 per cent of the total income. Thus Table 2 can be used as an aid to interpret the values of the I_0 indices calculated from real populations.

At level 1, about 29 per cent of total inequality is due to the inequality within men, about 57 per cent is due to inequality within women, and only 14 per cent is due to inequality between men and women. This means that if we were to equalize all male incomes at the male mean and all female incomes at the female mean, then 86 per cent of the existing inequality would be removed. The resulting population (one whose Shorrocks I_0 index is 0.067) would be the equivalent of one where, in a two-person society, the richer person received 68 per cent of the income (see Table 2).

The second level contains only the currently employed income recipients. This reduces the degree of inequality in this population, as measured by a fall in the I_0 index from 0.476 to 0.233. In a two-person society, this represents a fall in the richer person's share of total income from 89 per cent to 80.5 per cent. The inequality between the sexes falls as well. This is measured by the fall in the between-groups Shorrocks from 0.067 to 0.023. In a two-person society, this represents a fall in the share of the richer person (in our case the male) from 68 per cent to 60.5 per cent of total income. The contribution of the inequality between the sexes to total inequality falls from 14 per cent at level 1 to 10.1 per cent at this level. The

remaining 89.9 per cent of inequality is caused by the inequality within the members of each sex. Clearly, the differences in the labour force participation between males and females is a major source of inequality in their incomes.

The third level contains only the full-year full-time workers. Again, the total inequality in the remaining population falls. The I_0 falls from 0.233 to 0.149, representing a fall in the richer person's share from 80.5 per cent to 75.5 per cent. The inequality between the sexes is further reduced, as measured by the fall in the value of the between-groups Shorrocks from 0.023 to 0.007. This means that if we were to remove all inequalities within each sex, the richer person would now have 56 per cent rather than 60.5 per cent of the total income. The contribution of inequality between the sexes to total inequality in the economy falls from 10.1 per cent to 4.8 per cent. Thus the bulk of the inequality in this sub-population is caused by differences within each sex, rather than by the differences between the sexes. The differences between the number of hours worked by currently employed males and females does, however, explain some of the observed inequality between their incomes.

For the fourth round of analysis, only those workers who have post-school qualifications were selected. This leads to a further reduction in inequality in the remaining population, as measured by a fall in the value of the I_0 index from 0.149 to 0.136. In terms of the hypothetical two-person society, this represents a fall in the richer person's share of income from 75.5 per cent to 74.5 per cent. The