INDUSTRIAL SECTORS AND MALE-FEMALE DIFFERENCES IN EARNINGS

INDUSTRIAL SECTORS AND THE DETERMINANTS OF EARNINGS: MALE-FEMALE DIFFERENCES

By

MARGARET ANNE DENTON, B.A., M.A.

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AUTHOR: Margaret Anne Denton, B.A. (McMaster University)

M.A. (McMaster University)

SUPERVISOR: Dr. P. C. Pineo

MEMBERS SUPERVISORY COMMITTEE: Dr. A. L. Robb

Dr. C. Jones

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ABSTRACT

Empirical studies confirm the existence of a male-female earnings differential in Canada, with females on the average receiving about half the earnings that males do. This dissertation attempts to develop the most thorough and systematic model of earnings determination yet achieved in Canada, and to investigate the potential utility of a segmented economy approach to identify sources of male-female earnings inequalities. The earnings determination model includes individual earnings-related characteristics, background characteristics, and a measure of the industrial sector of the economy. The data used are from the 1973 Canadian Mobility Study and the Labour Force Survey. Findings indicate that women who are employed receive so little compared to men partly because they differ in the average levels of their income-related characteristics and partly because they differ in the processes by which they earn income. Of the two factors, however, the second is by far the most important source of income inequality between the sexes. When the economy is viewed as composed of three distinct economic sectors -- the core, the periphery and the state, the three sectors do appear to differ in the ways in which certain earnings-related characteristics are remunerated. Further, it appears as if the differences between men and women in their economic returns are not the same from sector to sector. The findings support two general conclusions in this regard. First, differences in returns for men and women are more frequent in the periphery than in either the core or state. Second, while still distinct, the processes by which men and women earn income are more similar in the

state than in either the core or the periphery. In the state, men and women receive nearly equivalent economic returns to their human capital factors, such as education and experience, while this is not the case in the other two sectors.

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CHAPTER 1

THE PROBLEM IN CONTEXT

Women in the Canadian Labour Force

In 1941, only one out of every five women in Canada worked for pay or profit (Armstrong and Armstrong, 1978:17).[1] Today, almost one out of every two women in Canada between the ages of 15-65 is in paid employment, and women currently make up some 37 per cent of the labour force (Canada, 1977). Who, then, are these women, and how do their employment experiences compare with those of men?

Not all women are equally likely to participate in the labour force. Participation rates vary with age, marital status, the presence and age of children, level of education, and other factors as well (Gunderson, 1976:98). Women aged 20-24 are much more likely to be employed than are older women; single women have higher participation rates than do ever-married women; and women with children are less likely to work for pay than are those without. Furthermore, the more formal education women have, the more likely they are to be employed.

Labour force participation rates have not increased uniformly for all categories of women over time. In particular, the participation rates for older women have increased much more dramatically than have those for younger ones. To illustrate this point, consider that, between 1921 and 1971, the labour force participation rate for women aged 20-24 increased by 57 per cent; for women over 35 years of age, however, it increased by

250 per cent (calculated from Gunderson, 1976:Table 4.1). This increase in the labour force participation of middle-aged women has meant a marked increase in the employment of married women, as well as of women with children. Almost no historical data on the labour force activity of married women exist for Canada, although Ostry (1968) has been able to piece together fragmentary data from the Census of Canada which bear on this issue. These data indicate that, in 1941, less than 4 per cent of married women were employed; by 1951, this figure had risen to 11.2 per cent and, by 1961, to 22.0 per cent (p. 4). Gunderson (1976:98) reports a labour force participation rate of 36.3 per cent for married women in 1971. In thirty years, then, the participation rate for married women increased ninefold -- far more rapidly than for women as a whole. Thus, it has been the entrance of older, married women into the labour force which has contributed most significantly to the overall growth in women's participation rates.

Although there has been a sharp increase in women working outside the home in the past forty years, these women have not moved into jobs distributed evenly across the range of industries or occupations. Women are disproportionately located in the trade, finance, insurance and real estate, community, business and personal service industries (see Gunderson, 1976:47), and are highly concentrated in a relatively small number of occupations, most notably as stenographers and typists, sales clerks, babysitters, maids and related workers, tailoresses, furriers and related workers, waitresses, nurses and nurses' assistants, teachers, telephone operators, and janitors and cleaners. These occupational categories accounted for 46.4 per cent of all female workers in Canada in

1971 (Armstrong and Armstrong, 1975). Data from the 1971 Census of Canada show that 55 per cent of working women are employed in just three of the twenty-one major occupational categories -- clerical, sales and services -- whereas males are much more evenly distributed across occupational divisions (see Hunter, 1981:115).

While the processes of the concentration and segregation of women in particular industries and occupations in Canada are not understood in detail, it is clear that increases in the demand for labour involving skills which are extensions into the marketplace of the traditional female domestic role occurred at a time when increasing numbers of (especially married) women were available for employment outside the home. In 1941, for example, 32 per cent of the labour force in Canada were employed in four broad industrial categories: trade, finance and real estate, community, business and personal services, and public administration and defence, and these same four categories employed over two-thirds of all women in the labour force (Gunderson, 1976:78-79). By 1971, these four industrial categories accounted for 54 per cent of the total labour force and over three-quarters of all employed women (as calculated from the Canada Year Book, 1978-79:363). Parallel to this, women became progressively more available to take on extra-familial roles with declining rates of fertility, decreases in the burden of housework, and changing attitudes toward married women and mothers working outside the home (Oppenheimer, 1970).

Gender and Earnings

Men and women in Canada differ not only in their occupations and industries of employment. They also differ in their earnings.[2] There is

a substantial male-female pay differential in Canada, with females receiving on the average a little more than about one-half of what men receive. This is a phenomenon which has received increasing attention in recent years from social scientists, who have sought to account for this enormous earnings gap. To neoclassical economists, differences among people in their earned incomes can be best understood by reference to differences among them in their productivities, and it is clear that the gap in pay between men and women who are comparable to one another in terms of such factors as hours worked, labour force experience, age, and occupation is much smaller than the overall gap between them (Edgecombe Robb, 1978; Goyder, 1981). At the same time, even the best-designed studies taking a large number of such factors into account typically report that a not inconsequential earnings gap remains unaccounted for, and the usual conclusion is that hidden productivity differences between men and women remain (Gunderson, 1976). To sociologists, the neoclassical, "human capital" approach to the analysis of earnings differentials between men and women is seen as useful to the extent that objective factors of productivity can be shown to be involved, but many are skeptical of attributing the unexplained earnings gap to unmeasured productivities in the face of evidence of income discrimination by gender. Even so, it is likewise implausible to identify the male-female earnings gap with discrimination alone, and it remains to be shown just what the extent of earnings discrimination[3] is and precisely what forms it assumes.

A newly-emergent, "third" approach to the analysis of the phenomena of gender earnings differences can be found in a loose body of writings by an increasing number of economists and sociologists who

question certain of the central assumptions of neoclassical economic approaches, most notably the assumption of a single, homogeneous market in which the buyers and sellers of labour operate in a state of unfettered competition according to the principles of supply and demand (Averitt, 1968; O'Connor, 1973). Instead, it is more and more frequently suggested, there are some sectors of the economy in which the assumption of open competition is useful in making sense of what happens when labour is bought and sold, and other sectors in which what happens makes better sense if the assumption of unrestricted competition is relaxed. As yet, it is too early to judge if a coherent body of telling criticisms of human capital theory will emerge from this new literature, much less that a viable, alternative theory is being forged from scraps of the old. No single research endeavour will decide these matters once and for all. The first purpose of this dissertation, however, is to develop the most thorough and systematic model of earnings determination yet achieved in Canada, so that the best estimates available to date can be made of the extent to which male-female earnings differentials can be shown to derive from factors relevant to productivity. The second purpose is to extend this model in an effort to identify more precisely than has been done before the nature and extent of gender market discrimination in Canada. And the third purpose is to investigate the potential utility of a segmented economy approach for understanding how it is that equal work does not necessarily mean equal pay.[4]

FOOTNOTES

1 This pattern of increasing labour force participation parallels the pattern found in many other countries such as the United States, Great Britain and several of the Western European countries,but in this dissertation, we refer only to the Canadian experience.

2 Earnings refer here to monetary remuneration for employment in the labour force. This includes both salaries and wages. The terms income and earnings have been used interchangeably throughout.

3 Earnings discrimination refers here to that portion of the male-female income gap which is not due to gender differences in the average level of earnings-related characteristics.

4 A few selected references on equal pay for work of equal value are: M. Gunderson, "Male-Female Wage Differentials and the Impact of Equal Pay Legislation", Review of Economics and Statistics, vol.LVII, 4 Nov., 1973.

L. Langlois-Trudel (Labour Canada), A Preliminary Study on the Principle of Equal Remuneration for Work of Equal Value. June, 1976.

CHAPTER 2

A CRITICAL REVIEW OF THE LITERATURE ON DETERMINANTS OF EARNINGS

Introduction

In recent years, North American sociologists have been increasingly drawn to consider the general issue of earnings determination and, in particular, of how it is that earnings vary so much by gender. This concern has a counterpart in the continuing interest of many economists who have studied this same problem from a neoclassical, "human capital" perspective. While economists focus especially on the relationship between earnings and human capital investments, such as schooling (see, for example, Mincer, 1970), sociologists concentrate primarily on the role of occupational status in determining wages and salaries -- specifically, on the ways in which occupational status intervenes between education and earnings (see, for example, Duncan, Featherman and Duncan, 1972; Jencks, 1972; Treiman and Terrell, 1976). Sociologists also stress the importance of ascribed characteristics, such as family background, ethnicity, and sex, for earnings (see, for example, Featherman and Hauser, 1976). While the emphasis in this chapter will be on a critical review of sociological models of male-female differences in earnings, the human capital literature will also be considered.

The Beginning: The Blau-Duncan Model

The development of models of earnings determination in sociology can be seen to begin with the Blau-Duncan (1967) model of status attain-

ment. The basic Blau-Duncan model is a causal analysis of how the social standing of a person's present occupation can be shown to be the consequence of the social standing of the person's first job and level of educational attainment, and how all three of these variables are to some degree determined by one or more parental status attributes -- most often the level of educational attainment and occupational status of the father.

A continuing concern in research on status attainment is the existence of other factors which might substantially modify the conclusions drawn from the basic model. Blau and Duncan began this tradition by considering the effects of factors such as race, region, national origin, and farm background on educational and occupational attainment. Following in their footsteps, sociologists, both in the U.S. and in other countries, have considered and reconsidered these and other factors thought potentially to modify the model. Of particular note here are the findings when women are compared to men with respect to status attainment. The original Blau-Duncan study and its 1973 replication (see Featherman and Hauser, 1978) sampled only males and, consequently, the female status attainment data reported in these studies are based on men reporting about their wives. A number of recent studies in the United States allow a comparison of male and female intergenerational (DeJong, Brawer and Robin, 1971) and intragenerational occupational mobility (Treiman and Terrell, 1975). McClendon (1976) employs the basic Blau-Duncan model for the U.S., as does Boyd (1979) for Canada, and the major conclusions from these studies and those cited above are that the male and female occupational status attainment structures are very much alike, and that respondent's education is the

most important determining factor for allocating both males and females to positions in occupational status hierarchies.[1]

The Income Attainment Model

In 1972, the status attainment model was extended for males to include income as a final dependent variable, with education, present occupation, and the three background variables of father's education and occupation and number of siblings as causes of income (Duncan, Featherman and Duncan, 1972) and, in a later version of the "income attainment model", these authors also added a measure of intelligence at age 12. This extension of the Blau-Duncan model to income, however, was only a modest start in the development of a model of earnings determination, as the basic model explains only some 11 per cent of the variance in earnings, as compared to 25 per cent of the variance in present occupational status, and it omits a number of variables which have subsequently been found to be important determinants of earnings.

Jencks, et al.'s Inequality: A Reassessment of the Effects of Family and Schooling in America (1972) reanalyzes an enormous body of prior research in an attempt to discover the roots of social and economic inequality and the role of education in these. Their model is, in essence, an extension of the status attainment model to consider the relationships among inequality in school facilities, family background, cognitive skills (as measured by childhood I.Q. and adult I.Q) and educational, occupational and income attainment. With respect to earnings, the general conclusion is: "Neither family background, cognitive skill, educational attainment, nor occupational status explains much of the variation in men's income" (p. 5). They attribute the bulk of the

variation in income to "luck", and proceed to argue for programs of income equalization. Inequality has been criticized on a number of different grounds, with the luck hypothesis a major target (see Levine and Bane, 1975). In a sequel to Inequality, entitled Who Gets Ahead?, Jencks, et al. (1979) estimate that the combined effects of family background, cognitive skill, noncognitive traits and education explain 55 to 60 per cent of the variance in status, and at least one-third of the variance in earnings. Again, Jencks introduces the notion of luck to account for the unexplained variance, but this time he offers a further elaboration of what he means by luck. It refers to labour market imperfections or structural features of the economy which cause identical workers to have unequal status and earnings, although he cannot imagine a research design that would measure these imperfections directly.

The status attainment model has been severely criticized as an explanation of earnings determination. The major critique -- sometimes labeled "The Great R^2 Debate" -- centers on the large amount of variance left unexplained by the model, where a number of authors (see Crowder, 1974; Levine and Bane, 1975) argue that, in addition to the factors considered in the status attainment model, other important determinants of earnings must also be included in the model. In response to this critique, the model has been expanded to include such earnings-related characteristics as years of experience, hours worked and age (Featherman and Hauser, 1976).

Male-Female Differences in Models of Earnings Determination

As previously noted, women earn much less than men overall, and women also earn less than men, even when the sexes are equated in terms

of their levels of educational attainment and occupational status, although the gap between is reduced when education and occupation are taken into account (seeTreiman and Terrell, 1975; Featherman and Hauser, 1976; Bibb and Form, 1977; Goyder, 1981). What then might account for the fact that employed men earn measurably more than employed women do?

Male-female differentials in earnings derive from one or the other or some combination of: differences between the sexes in their average levels of certain earnings-related attributes, and differences between them in the processes by which they earn income. To assess how these differences relate to male-female earnings differentials, sociologists typically compare results from income attainment models run separately for women and use one or another version of a special technique (see, for example, Duncan, 1968). It will serve us well to describe this technique -- the decomposition of differences -- before reviewing the sociological literature on male-female earnings differentials.

First, a regression equation model is defined and is estimated independently from data in several subgroups. This model takes the partial regression coefficients as representing the social processes of income attainment.

Second, the mean values of the independent variables for one group are then substituted into the equation for the other group. When this is done, it is possible to estimate what the average value on the dependent variable would be for the second group, if that group did not differ from the first in terms of their mean values on the independent variables. So, if separate regression equations for men and women are computed, in which amount of earnings (the dependent variable) is predicted from some earnings-related characteristics (a set of independent

variables) for each group, and the mean values for these chara
for men are substituted into the equation for women, it is possible to estimate what the average income of the women might be if they did not differ from the men in these characteristics. For example, Fuchs (1974), in the first major study which examined the differences in hourly earnings between men and women, substitutes the male means into the female regression equation in an attempt to account for the earnings differential between men and women in the 1960 U. S. Census. He finds that women earn on the average about 60 per cent as much as men in hourly income; however, this figure increases to 61 per cent when the data were adjusted for colour, schooling, age and city size, and to 66 per cent when marital status, class of worker, and length of the work trip were also taken into account.

Third, the regression coefficients for the independent variables for one group are then substituted into the equation for the other group (or alternatively, the mean values on the independent variables for the "other group" are then substituted into the equation of the original group). When this is done, it is possible to estimate what the average value on the dependent variable would be for the original group, if that group earned income by the same processes as the other did. So, if the male regression coefficients were substituted into the female equation, this would allow an assessment of how much the male-female earnings differential would be reduced if women earned income by the same processes as men do.

One final note on technique: the equations are often calculated in both standardized and unstandardized form, and the interpretation of

each provides answers to separate questions. The standardized ("beta") coefficients allow, primarily, an assessment of the relative importance within each gender of the determinants entered into the model. For example, Goyder (1981) employing standardized regression coefficients, finds that the single most important determinant of earnings for females is hours worked. The unstandardized regression ("b") coefficients allow an assessment of the relative importance of determinants between the sexes. For example, in a comparison of the unstandardized regression coefficients from the male and female equations, Goyder concludes that occupational status converts into income at a higher rate for males than for females.

In a study which serves as a prototype for a number of more recent analyses, Suter and Miller (1973) match samples of each sex in an effort to compare the wage or salary incomes in 1966 of women 30-44 years of age in the U.S. to those of men in the same age group, classified according to education, occupational status and work experience. This study attempts to estimate the combined and independent effects of factors that influence women's income as against similar effects for men by comparing separate regression equations for men's and women's income. Suter and Miller observe that, on the average, women exchange educational level or occupational status for income at less than half the rate received by men. When they examine the payoffs to education and occupational status for income for a select group of career women, they find that the coefficients for career women are in fact closer to those for men but they, too, are far from equal. Thus, they conclude, "women are unable to change education and occupational status into earnings at the

same high rate as men even when women are full-time workers wit able lifetime work experience" (p. 971). Suter and Miller also introduce marital status and presence of children as additional factors affecting income level in the model, but find that once women's occupational status and work experience are known, marital status and presence or absence of children does not significantly improve the ability to predict income. With three independent variables--educational attainment, occupational status, part-time versus full-time employment--Suter and Miller's model explains 29 per cent of the variance in income for men and 49 per cent for women. This higher per cent of variance explained for women is due largely to the greater importance for women of the full-time versus part-time factor in the model. Suter and Miller also estimate the proportion of the overall disparity in income that is attributable to male-female differences in determinants of income. Their data reveal that mean female income reached only some 62 per cent of the male average, even after adjustments for the effects of education, occupation, career discontinuity, and part-time versus full-time work. They note that the remaining 38 per cent represents the portion of male/female income differences produced by all other factors that have not been taken into account in this study.

Treiman and Terrell (1975) extend Suter and Miller's analysis as part of an investigation into "Sex and the Process of Status Attainment". They compare the processes of educational, occupational and income attainment for working women aged 30-44 and their husbands, utilizing data from a more recent representative national U.S. sample (Parnes, et al., 1970). As expected, the processes and levels of educational and

occupational attainment are found to be virtually identical for women and men, but women are found to earn less than half as much as the men; and when differences in hours worked per year, per cent of years worked, and number of children are controlled for, the female-to-male income ratio rises from 42 to 67 per cent.

Following Suter and Miller's example, Treiman and Terrell also consider differences in the specific determinants of income. They, too, find that the income advantage of additional education is about one-fourth for wives of what it is for their husbands, while the payoff for each additional hour of work is twice as large for women as for men. The far greater importance of amount of time spent working as a determinant of the earnings of wives is reflected in the differential ability of the model to predict earnings for wives and husbands. Over half of the variance in the earnings of wives is attributable to variations in education, occupation, amount of time spent working, and work experience, whereas the same variables account for only about one-fifth of the variance in the earnings of husbands (R^2= .531 vs. .197). Also, the number of children has no significant effect on earnings for either husbands or wives.

Treiman and Terrell also examine differences in earnings and the determinants of earnings of single and ever-married women. Their findings suggest that single women earn substantially more than married women (although much of this discrepancy is due to their higher educational and occupational status, longer working hours, greater work experience and fewer children), but still much less than men. In addition, the determinants of earnings for single women are more similar to those of

men than are those of ever-married women.

The work of Featherman and Hauser (1976) is a development of the earnings determination model used by Suter and Miller (1973) and Treiman and Terrell (1975). It includes a number of additional social background variables, such as number of siblings, father's occupation, and farm background, as well as hours at work in the year prior to the survey, an estimate of years of work experience, and experience squared to represent the decay or deterioration of human capital as a function of age. The latter two factors, they admit, are especially problematic for the female sample, as they are based simply on age, and do not take into consideration career interruptions. They employ data on husbands and wives aged 20-64 from the original Blau-Duncan sample and its 1973 replication. The data on women may be suspect because they originate in information provided by men about their wives.

Featherman and Hauser's data indicate that the ratio of female to male earnings was .39 in 1962 and .38 in 1973, despite similar average levels of educational and occupational status for men and women. Income differences are reduced by only 15 per cent (from $4,815 to $4,100) in 1962 and 16.1 per cent (from $6,942 to $5,825) in 1973 when mean differences between the sexes in the determinants of earnings are controlled. This should not be surprising, they note, given the virtually equal composition of the sexes with respect to family factors, education and occupational status.

The separate multiple regression equations in Featherman and Hauser's analysis document the different processes by which the earnings of husbands and wives are generated. The major factors for men are the

countervailing effects of the accumulation of occupational experience and the deterioration of capacity--both associated with aging. Education, occupation, and hours worked in the previous year follow in order of relative importance as income determinants for men in both 1962 and 1973. Family origins play a rather minor role in the determination of men's earnings, although the effects are statistically significant, even among men of equal age, schooling and occupational status. By contrast, family background has no appreciable bearing on earnings for women, except for the "cost" of farm origins. At both survey dates, time in the labour force is the most important influence on women's earnings. But, as Featherman and Hauser note, experience and experience squared have rather doubtful interpretations for women.

As reported in other studies, Featherman and Hauser also find that women receive lower net returns to education and occupational status than men, despite the apparent equality of educational and occupational status between the sexes. The ratio of female to male net returns to education is 0.25 in 1962 and 0.38 in 1973. The ratio of female to male net returns to occupational status in the full model is .66 in 1962 and .48 in 1973. Similar to those in other studies, Featherman and Hauser's model explains more of the variation in earnings for women than for men, largely due to the appreciable compositional differences between the sexes associated with work experience and time in the labour force.

Goyder's (1981) analysis is the first sociological study in the Canadian literature that estimates the importance of education, occupation, career continuity, and part-time versus full-time work for men's and women's earnings. The data in this study are taken from the

Canadian Mobility study, which was a supplement to the July, 1973 Canadian Labour Force Survey. This study was similar in scope and design to the original Blau-Duncan study and its 1973 replication (Featherman and Hauser, 1978); however, the Canadian study includes females as respondents, rather than simply asking husbands questions about their wives. First, examining the means and standard deviations, Goyder points out that, while female incomes are on the order of only 46 per cent of male incomes, women have slightly higher occupational and educational statuses than males (a finding dissimilar to U.S. findings, but see Lyon, et al., 1982), that males work considerably more hours per year than did females, and that males are far more likely than females to have uninterrupted careers. Second, using the substitution of means technique, he estimates that, if women aged 30-44 worked the same amount of time each year, the same proportion of years over the career as males, and held the same education and occupational status, their average earnings would be about 64 per cent of the male average.

Goyder examines the determinants of income by sex and, consistent with findings from the U.S. (see Suter and Miller, 1973; and Treiman and Terrell, 1975), he reports that there is a greater payoff to occupational status for males than females, and that the factors of hours worked and career continuity are more important for women's incomes than for men's. Marital status and number of children are of negligible importance when added to the model incorporating career continuity and hours worked. Contrary to U.S. studies, Goyder does not find greater income returns to education for males than for females. Rather, for the 30-44 year old sample, the converse is true and, for the full sample, the

payoffs to each additional year of education are essentially the same for males and females when occupation, hours worked, and continuity are included in the model.

In this review of the sociological literature on the determinants of income, a number of consistent patterns can be seen. First, in both Canada and the U.S., women earn at best about half of what men earn, although the female-to-male earnings ratio appears to be somewhat lower in the U.S. than in Canada. When differences in such income determinants as education, occupational status, hours worked, experience, etc., are controlled, the income disparity between the sexes is somewhat reduced, but a large earnings disparity remains. Second, the data indicate sharply different processes by which the earnings of men and women are generated. In all studies, males are found to receive more income for each unit of occupational status than do females and, with the exception of Goyder's research (1981), the same is true of years of education attained. For women, the most important determinant of earnings is hours worked per week but, since this predictor has very little variance in the male sample, it has virtually no effect as a determinant of earnings for men. Marital status and number of children are not important earnings determinants, net of other factors for either males or females, while family background factors appear to play a small role in the determination of income for males, but not for females.

The Economics Literature

The study of income inequality transcends disciplinary boundaries. At the same time as sociologists have been studying male-female differences in earnings, economists have also been investigating income

inequalities between the sexes. These two approaches share many similarities, but differ in a number of important ways. In this section, the major approach to studying individual earnings in economics will be outlined; the major findings by economists on sexual discrimination in earnings in Canada will then be reviewed; and, finally, similarities and differences between the sociological and economic approaches will be identified. The chapter will then end with a critical review of traditional models of earnings determination.

The study of the determinants of earnings by economists has largely been done in the context of neoclassical economic theory, especially that application of neoclassical economics known as human capital theory. Human capital theory is an extension of neoclassical economics to explain the "investments" which people make in themselves (hence, "human" capital) in relation to the rewards which they receive in return, the principal author of which is Becker (1957). Briefly, human capital theory views people as choosing to acquire productive capacities (e.g., general education, specific training, on-the-job experience, etc.) so as to maximize their long-run (monetary and nonmonetary) benefits for that part of their time which they prefer to devote to paid employment (Cain, 1976). It is assumed that these choices are made intelligently, within the limits of people's abilities and their educational and occupational opportunities (Mincer, 1970), and that people are paid their marginal products, i.e., the incremental market value of their contribution to production, by profit-maximizing employers operating in open competition with others of their kind.

In the neoclassical theory of earnings determination, a wage rate

is generated in a labour market as a result of the interaction of the supply of and demand for labour. Demand for labour is determined by the demand for products, as reflected in their monetary value, and the link between wages and the value of products is established through the concept of marginal productivity, as profit-maximizing firms will be in equilibrium when the value of the marginal product equals the marginal cost or price of labour as a factor of production (Sorensen and Kalleberg, 1982:54).

Differences in skills and, hence, in "productivities", according to human capital theory, result in different wage rates and earnings. From this perspective, the distribution of earnings is determined by the distribution of productivities--those factors which affect a worker's productivity, such as education, on-the-job training, experience, and even motivation (see Mincer, 1974). Thus, the basic proposition derived from neoclassical theory is that differences in earnings reflect differences in the productive capacities of persons as a result of their training, education and experiences. There may be transient variations in earning, but the basic source of inequality in earnings is unequal endowments in productive capacities of individuals. In the words of Sorensen and Kalleberg (1982:55) "identical persons are assumed to obtain almost identical earnings, regardless of the characteristics of the jobs they are in."

A Review of Economic Studies on Discrimination in Earnings

Studies by economists of male-female earnings in Canada rely on techniques which are very similar to those described above. Briefly, earnings is regressed on a number of income-related characteristics

separately for males and females to estimate the causal importance of each, and other variables, such as industry, occupation or region are often included (typically in dummy variable form) in order to control for their effects (see, for example, Oaxaca, 1973; Edgecombe Robb, 1978). Then, using the substitution of means and regression coefficients techniques, the extent and sources of earnings discrimination are identified (see Ostry, 1968; Holmes, 1976; Edgecombe Robb, 1978).[2]

In a review of these studies, Agarwal and Jain (1978) point to two major conclusions which emerge from the data. First, similar to the findings reported in the sociological literature, the earnings differentials between men and women are considerably narrower after controlling for differences in occupation (see Ostry, 1968; Holmes, 1976, Edgecombe Robb, 1978) and experience (see Ostry, 1968; Edgecombe Robb, 1978). Agarwal and Jain note that the extent of discrimination in earnings revealed in these surveys ranges from 8 to 44 percentage points, the average being 23, and they conclude that certain occupational groups tend to have somewhat lower male-to-female earnings ratios, such that, within high level occupational categories there are above average earnings differentials between the sexes (see Ostry, 1968; Gunderson, 1975).

The findings reported by economists concur with the conclusions reached in the sociological literature that the processes by which men and women earn income are very different. Males are rewarded more highly than females for comparable education (see Holmes, 1976; Edgecombe Robb, 1978), and experience levels (see Edgecombe Robb, 1978), and the most important determinant for women is weeks worked per year (Holmes, 1977). The findings with regard to marital status are quite interesting.

Edgecombe Robb (1978:358) reports that the market appears to reward married males more than single males, but that the opposite is true for females--a result which she finds uninterpretable.

Gunderson's (1975) study of the impact of equal pay legislation is quite unique. He is able to match males and females in occupations within establishments to assess the extent of discrimination in earnings against females. His findings indicate that male wages exceed female wages by 22 per cent in jobs with identical job descriptions. Turning his attention to possible sources of discrimination, he finds that unions are effective in bargaining for equal pay, with a male-female pay differential 10 percentage points smaller in unionized than in nonunionized establishments and, as well, firms with incentive-pay systems have a smaller female-male pay differential than do firms with no such system. His findings also indicate that there is a large male-female wage differential in the trade sector, that discrimination against females tends to be strongest in skilled jobs, and that the earnings differential is smallest in large cities.

As we have seen, sociologists and economists share a common interest in the processes that produce variation in individual earnings. In addition, they employ similar research designs and statistical procedures, and their findings tend quite consistently to reinforce one another. At the same time, the intellectual histories which have led sociologists and economists to study these labour market processes are quite different. Sociologists can trace the origin of their interest in the determinants of earnings to a concern with explaining status attainment, while economists have evolved an interest in empirical research

on earnings out of developments in neoclassical economic theory, especially that extension of the theory known as human capital theory.

While the theoretical underpinnings of the status attainment model are not as explicitly laid out or developed as those in neoclassical economics, both share many of the same basic assumptions.[3] Both sociologists and economists, for example, focus on the individual and his or her earnings, that is, on issues of supply. Both groups include as determinants in their models those income-related characteristics which an individual brings to a job, such as education, on-the-job training, experience and motivation. Neither group gives much attention to factors that structure the demand for labour. Both groups recognize that earnings differentials also capture variations in ability, where ability refers to such characteristics as I.Q. (see Jencks, 1972, 1979), motivation and creativity (see Mincer, 1974).

One major difference between the sociological and economic approaches to studying individual earnings seems to be the emphasis given by sociologists to the role of a worker's occupation in determining earnings and, in particular, to the ways in which occupational status intervenes between earnings and education and measured I.Q. Also important to the sociological model of earnings determination are social background characteristics which operate both directly and indirectly (through their influence on education) to determine earnings. Economists, by contrast, tend to focus on the role of education and other factors that influence productivity, such as on-the-job training and experience, as determinants of income, and typically pay little attention to the role of occupational status or social background characteristics.

A Conceptual Critique of the Neoclassical/Human Capital Approach

The human capital theory adaptation of neoclassical economics has an attractive, formal simplicity. It has found application in a wide variety of seemingly unrelated problem areas in social science outside of economics as such, and it has generated a voluminous empirical literature. At the same time, questions can be raised as to the adequacy of certain central assumptions involved in it, and it provides a conceptualization of labour market phenomena which is incomplete in several important respects.

What, then, are some of the problems in the assumptions of human capital theory? First, how viable is the assumption of perfect competition in the labour market? In practice, neoclassical economists acknowledge that competition in real-world markets is "imperfect", so that the basic disagreement revolves about the usefulness of treating markets as if they were freely competitive. Proponents of the neoclassical position argue that existing market imperfections (e.g., labour unions, employer monopsonies, certain kinds of government legislation, etc.) do not invalidate the theory in the long run (Cain, 1975,1976; Sahota, 1978).

Opponents claim that there are departures from perfect competition which are significant enough systematically to confound the predications of neoclassical theory (Gordon, 1972; Bowles and Gintis, 1975; Blaug, 1976; Kalleberg and Sorenson, 1979). The problem here is that important aspects of the deductive power of the neoclassical theory are lost when the assumption of open competition is relaxed, and that no very satisfactory theory of the distribution of economic rewards exists for markets that are neither perfectly competitive nor entirely monopolistic.

Second, how plausible is it to assume that people are paid their marginal products? For one thing, marginal productivity theory is ambiguous and, therefore, difficult to test because of such outstanding questions as the time period (e.g., instantaneously? weeks? months? years? lifetimes?) over which product payments are made, and whether it is individuals or groups who are paid their marginal products (Thurow, 1975: Appendix A).

Third, human capital theory purports to deal not only with people's monetary returns from investments, but also their nonmonetary, or "psychic", returns. Since we do not know how psychic benefits (e.g. intrinsic job satisfaction, pleasures derived from living in a particular neighbourhood, city or province, etc.) may compensate for monetary returns, the theory is strictly testable only under the assumption that the desire for psychic benefits does not differ from person to person nor from job to job (Osberg, 1981: Chapter 7).

Human capital theory per se can also be seen to present an incomplete conceptualization of certain labour market phenomena. First, it largely ignores the role of occupation for earnings and the earnings determination process, even though we know that labour markets are seg-

mented along occupational lines, i.e., that electricians compete with electricians and sociologists with sociologists, but not electricians with sociologists, etc. Further, having an occupation is the means through which a person receives earnings, and both the amount of earnings and the processes by which they are received differ across occupations (Stolzenberg, 1975). Second, it is primarily a theory of labour supply, and little effort has been made to incorporate demand factors into the model.[4] Third, human capital theory tends to emphasize the importance of such easily measurable, individual-level factors as amount of formal education and specific vocational training, and the length of on-the-job experience, to the relative neglect of the often more elusive elements of family social background influences, ability, preschool and informal experiences, type of education or training, and attitudes as possible determinants of productivity and, hence, of earnings.

In general, most economists and sociologists recognize some gender earnings discrimination in the labour market, and a number of "theories of discrimination" have been developed to explain this phenomenon. First, the male-female earnings gap has been explained by economists as a result of discriminating attitudes on the part of employers, of male employees or of customers. Such "tastes" for discrimination form the basis of the "theory of discrimination" advanced by Becker (1957).

Briefly, he argues that neoclassical economics is based on the assumptions that workers seek to maximize their earnings and employers their profits by means of rational decisions made under conditions of free competition. However, employers who discriminate against women by paying them less do so at a risk of profits foregone. For example, if they decline to hire women, some of their competitors will hire them at

a reduced rate of pay and reap the benefits of cheap labour. If they hire women but pay them a lower rate of pay, some of their competitors will lure them away with offers of higher wages. In either case, employers who discriminate will pay for the privilege and discrimination will exist only as a short-run market imperfection. Thus there are reasons within this theory to expect such earnings differentials to be eliminated in the long-run through the operation of natural market forces.

The second theory of discrimination offers perhaps the best explanation of gender earnings discrimination. According to the model of statistical discrimination, if employers, either rightly or wrongly, believe that one category of people, i.e., women, are less productive than some other group, i.e., men, profit maximizing behaviour may lead them to discriminate against women in the labour force. They may pay a woman with the same productive capacities less than a man with the same productivities or they may fail to hire her at all for a specific job. Thus women may suffer from "statistical discrimination" because of the objective characteristics of the gender to which she belongs, although she, herself, is satisfactory. However, if men and women are, on average, equal in abilities, etc., then the same argument applies here as in the case of the neoclassical model. If there are profits to be made while everyone else is discriminating by not doing so, those firms who do not discriminate will drive the others out of business.

How viable is the assumption that the labour markets are moving towards equilibrium, such that "imperfections", e.g., earnings discrimination by gender, are but a transient phenomenon which will tend to disappear in the long run? In the case of earnings discrimination, there

is some evidence to suggest that, far from decreasing, the income gap remains constant (Carroll, 1980) or is in fact increasing over time (Ostry, 1968; Gunderson, 1976; McDonald, 1975).

Other Sources of Earnings Differences

Neoclassical economists argue that not all (and some argue that "none") of the earnings differences between the sexes is due to discrimination. Some, like Block (1982), contend that the institution of marriage creates advantages for men and disadvantages for women in the market, making it appear as if there is employer discrimination, whereas there is not. Others admit to some earnings discrimination in the labour market, and a number of additional "theories" have been developed to account for it.

Firstly, the human capital approach has been used to explain the earnings gap in terms of the differential work experience of men and women (Mincer and Polachek, 1974 and Gunderson, 1976). Gunderson (1976) claims that females will have lower productivities than males for a number of reasons. First, women tend to stay in the labour force for shorter and more intermittent periods when they engage in household activities, especially child-raising. He writes that, "Because of this weaker commitment to the labour force women in general do not acquire as much labour market experience as men. In many cases, women and their employers have been unwilling to make substantial investments in training and labour-market-oriented education, in case the women leave the labour force and not use the training" (p. 119). To a certain extent, productivity differences are captured by some of the explanatory variables included in the models. However, it is impossible to measure and include many of these

hidden productivities in the model. Productivity differences, regardless of source, he says, will influence earnings because they affect performances, which is the employer's principal concern. In answering the question as to what are the reasons for the differences in earnings, he concludes:

> The extent of the differential that can be attributed to discrimination depends on the extent to which productivity differences themselves arise from sex discrimination. If one argues that current productivity differences are due to past discrimination, then all of the unadjusted wage gap can be attributed to discrimination. Alternatively, if one argues that current productivity differences reflect rational choices, especially with respect to household responsibilities, then only a small portion of the wage gap can be attributed to discrimination. But even if we use the more conservative productivity-adjusted wage gap, a substantial differential of approximately 10 per cent still exists. (Gunderson, 1976:120; emphasis my own.)

In Summary

In this chapter, an attempt has been made to review research which measures gender discrimination in earnings in the Canadian labour force. Both sociologists and economists have attempted to arrive at quantitative estimates of the extent of discrimination in earnings, controlling for those characteristics on which men and women differ and, as we have seen, these estimates range from 8 to 44 percentage points, depending on the factors controlled. This still leaves about half of the earnings differential unexplained. What, then, could account for the unexplained discrepancy in earnings?

There are at least two possible answers to this question. First, the model may be either misspecified or simply incomplete, in that all of the individual characteristics or marginal productivities which determine earnings have either not been properly included in the model or have not been included in the model at all. What, for example, is the role of motivation in determining income? Second, notwithstanding the attempts by sociologists to include occupational status in their models, little effort has been made to take account of "demand" factors or "structural variables". Attention is not paid to the manner in which industries structure the occupational distribution, or to the fact that many characteristics of occupations, such as earnings, vary by industry. Gordon (1972:38), in criticizing the human capital model, notes that, "even when industry is a unit of observation, industrial characteristics are standardized by the 'skill mix' in the industry to escape the necessity of explaining variation among industries in occupational structures". So, too, with earnings: models of the determinants of earnings concentrate on

describing the marginal productivities that a worker brings to a job as the crucial factor determining earnings, rather than focusing on the ways in which institutions may tend to define and limit the income available.

A number of conceptual criticisms have been made of the status attainment and neoclassical/human capital models of earnings determination. It is these models which provide the theoretical basis for the empirical research on earnings differences in Canada. These criticisms, if valid, may partly explain why these models do not explain the persistent male-female wage disparities. A number of attempts have been made in recent years to address these criticisms, and the next chapter reviews one of the more important of these--segmented economy theory.

FOOTNOTES

1 These studies can be criticized, however, for employing socio-economic index or SEI scores (Duncan, 1961) constructed from male data for both men and women, and for not considering the very different distributions of men and women in the occupational structure.

2 Edgecombe Robb, for example, estimates earnings functions for both males and females using the one per cent 1971 Census tape. These results are used to calculate the percentage of the logarithmic earnings differential attributed to discrimination.

3 The status attainment research (which includes its extention to earnings) is an outgrowth of the structural function perspective on social stratification (see Davis, Kingsley and Wilbert E. Moore, "Some Principles of Stratification," American Sociological Review, 10(1945) 242-249).

4 For an example of a neoclassical economic study that does incorporate demand factors into the model, see Freeman, 1976.

CHAPTER 3

THE THEORY OF THE SEGMENTED ECONOMY AND ITS EFFECT ON EARNINGS

Introduction

A major development in research on income inequality in recent years has been the call for sociologists to incorporate institutional and structural variables into the socioeconomic achievement model. It is possible to identify at least three separate, but related, responses to this call. These include: (a) the incorporation of variables measuring aspects of occupation in addition to socioeconomic status (see, for example, McLaughlin, 1978; Hunter and Manley, 1982), (b) the inclusion of variables that measure Marxist class membership (see, for example, Wright and Perrone, 1977; Kalleberg and Griffin, 1980; Lord and Falk, 1980), and (c) the incorporation of variables that capture economic segmentation (see, for example, Stolzenberg, 1975, 1978; Spilerman, 1977; Bibb and Form, 1977; Beck, et al, 1978, 1980). While the first and second approaches have both been shown to make important contributions to understanding earnings inequalities, this chapter is mainly concerned to develop the segmented economy model and to include segmented economy measures in earnings determination models.

The Theory of the Dual Economy

The predominant segmented economy approach in sociology is that of the dual economy. Despite its frequent and increasing use in studies on earnings, however, dual economy theory remains in a relatively undeveloped state. In one of the first attempts systematically to lay out

a well-defined theoretical model of the dual economy, Hodson and Kaufman (1982) have identified four basic elements involved in it:

> a dual economy which represents the organizational structure of capital; a dual labor market which represents the organization of labor within capital structures; a set of outcomes for workers which result from their participation in the labor market; and a social division of labour in terms of racial, ethnic, and gender groups (pp.728).

The following analysis of dual economy theory elaborates upon each of the four elements identified by Hodson and Kaufman.

Capital Structure

In dual economy theory, economic sectors are conceptualized as structural entities which derive from the nature of modern industrial capitalism. This theory posits, in part, that the industrial economy has evolved into a dualistic structure, in which one sector is characterized by oligopolistic capitalism and the other by competitive capitalism (Averitt, 1968; Baran and Sweezy, 1966; Beck, et al., 1978, 1980; Bibb and Form, 1977; Bluestone, et al., 1973; Cain, 1976; Edwards, et al., 1975, 1979; Fusfeld, 1973; Gordon, 1972; Harrison, 1974; Hodson, 1978; Kalleberg and Sorensen, 1979; Reich, et al., 1973; Galbraith, 1973; Wallace and Kalleberg, 1981). These sectors have been given various labels; "core" vs. "periphery" (Beck, Horan and Tolbert, 1978, 1980), "monopoly" vs. "competitive" (O'Connor, 1973), "centre" vs. "periphery" (Averitt, 1968) and "planning" and "market" systems (Galbraith, 1973). Although there is no consensus with regard to the names given to the two sectors, there is basic agreement on what the key characteristics are which distinguish them from one another, namely: financial size, influence, scale of employment, conglomerate organization and long term planning

capabilities, and, most importantly, market power or concentration. Specifically, core firms are identified as being monopolists or oligopolists in their product markets, while periphery firms are competitors (Hodson and Kaufman, 1982). The core sector is characterized by a relatively small number of large oligopolistic firms (typified in Canada by the automobile manufacturers and iron and steel mills (Marfels, 1976)). Their organizations are corporate and bureaucratic, and they tend to have high product market concentration, product diversification, high profit margins, capital intensiveness, inelastic product demand and high public visibility (Bluestone, et al., 1973:28-29). Their assets are substantial and they generally employ a very large labour force. By contrast, the periphery sector is composed of a large number of small firms, often family owned and operated. In Canada, the periphery can be associated with firms in the trade and personal service sectors, and in such manufacturing industries as knitting mills (Marfels, 1976). Firms in the periphery are characterized by low product market concentration, low profit margins, few assets, labour intensity, low productivity, elastic product demand and strong product market competition (Bluestone, et al., 1973:28-29). Periphery firms are noted for low job skill needs, low wages, minimal on-the-job training and high worker turnover. The degree of market concentration or, conversely, market competition determines the ability of a firm to administer prices, rather than having them determined chiefly in the market. In the periphery sector, product market competition is fierce because a large number of small firms compete with each other, none of which can gain control of the market. Other things being equal, productivity increases in periphery industries tend to mean lower commodity prices, instead of

higher profit margins or higher wages. In the core sector, because of greater market concentration, prices are not primarily determined by market forces or directly tied to the cost of production, but rather accord with a desired level of profit (O'Connor, 1973; Galbraith, 1973).

What are the origins of the dual economy? Theorists from this perspective suggest that there has been an historical trend toward the development of a dichotomous industrial structure. Various features of the economic and social organization of production have been identified as responsible for this duality. (See Wallace and Kalleberg, 1981 for a detailed discussion of the origins of the dual economy). Among these, three particular causes are frequently singled out. The first was the ability of some firms to adapt successfully to a changing environment through a technical evolution of production (Averitt, 1968; Galbraith, 1973). This involved capital investment in modern machinery and equipment, so that production demands could be met in a more technically efficient way. In manufacturing industries, for example, this resulted in the assembly-line method of production. The second factor is the accumulation and centralization of capital in a relatively small number of dominant corporations (Averitt, 1968; Wallace and Kalleberg, 1981). As more investment was made in capital equipment, firms were able to recognize economies of scale and to grow (in terms of assets), preventing smaller, less capital intensive firms from competing successfully in their market. As a result, some firms developed a high degree of market power --concentration--in their industry. The third factor is the development of bureaucratic control. As some firms became larger in size and more centralized in their product market, it was no longer possible for a

single person to oversee directly the entire production process. The result was the development of a policy of bureaucratic control that has been pervasive in core firms since World War II (Edwards, 1979). In the periphery, control tends to be personal in nature, with authority vested in a single person or, in larger firms, in layers of foremen or supervisors in a hierarchical structure. In the core, control is generally vested in the formal structure of the firm, rather than in personal relationships between owners and workers. Because core firms can administer prices and are not bound by the short term profit maximizing constraints of periphery ones, they are better able to make long range planning decisions (Galbraith, 1973), and to minimize worker unrest by responding to the demands of labour for better wages and working conditions.

Organization of Labour

The dual economy model is linked to that of dual labour markets, and the manner of articulation and the degree of overlap between the two models are topics of recent debate. Dual economy theorists typically argue that corresponding to the core and periphery sectors are two distinct--even separate--labour markets: a primary and a secondary one. As well, it is often suggested that "internal labour markets" are characteristic of core industries, but not of periphery industries. Before turning to the debate over the relationships between economic sectors and labour markets, however, the literature on dual labour markets will be reviewed.

As noted previously, debate surrounds the question of the usefulness of the assumption in theoretical analyses of a perfectly competitive labour market. While it is generally agreed that imperfections do exist in labour markets, not everyone agrees that there are enduring

features of these markets which must systematically be taken into account and given explanation. Some, however, do. These include, most notably, a group of labour economists in the U.S. whose position began to take shape in the 1960s (the chief spokesman being Piore, 1968, 1969, 1970, 1973, 1975). In their view, deviations from the perfect market assumption of orthodox economic theory are not seen as mere imperfections, but rather as pointing to the existence of multiple, isolated labour markets. Within this emergent tradition, there are two clearly identifiable approaches: one which assumes that the national labour market is segmented into two (sometimes three) distinct markets with barriers to mobility between each--often labeled the "segmented", "multiple", or, in a very popular version, "dual labour market" perspective; and a second which emphasizes the specific institutional setting for labour market processes, and makes a fundamental distinction between external and internal markets--often labeled the "internal labour market" perspective.

The dual labour market approach is largely descriptive in nature, and was initially proposed as an attempt to understand the labour force problems of the disadvantaged in the U.S., particularly black workers in urban, core areas. The basic hypothesis is that the labour market is divided into two distinct sectors, termed the "primary" and the "secondary", based on the characteristics of jobs in each sector. The distinction between the two sectors is fundamentally between "good" and "bad" jobs. The primary sector offers (good) jobs with relatively high wages, favourable working conditions, chances for advancement, equity and due process in the administration of work rules and, above all, employment stability. The secondary sector, by contrast, provides (bad) jobs which are often

low paying, with unfavourable working conditions and little chance of advancement. These (bad) jobs are characterized by considerable instability, high labour force turnover, and highly personalized relationships between workers and supervisors which leave wide latitude for favoritism and arbitrary work discipline (Piore, 1975:126). Piore further distinguishes between upper-tier and lower-tier primary jobs in terms of such characteristics as status, pay, opportunities for promotion, and autonomy. The most important characteristics distinguishing jobs in the primary sector from those in the secondary sector appear to be the behavioural requirements of the work force, particularly employment stability (i.e., regularity and punctuality). Edwards (1975) points out that stable work habits can also be seen as a consequence of the organizational context of jobs in the secondary sector. Employers in this sector offer little incentive to workers to stay on the job; workers respond by switching jobs frequently. Further, Piore argues, the behavioural traits associated with the secondary sector are reinforced by the process of working in secondary jobs and living among others whose lifestyles are accommodated to that type of employment.

A central hypothesis of the dual labour market approach is that there is little mobility between sectoral divisions within the labour force. The available empirical evidence, however, does not lend strong support to this prediction (see Kalleberg and Sorensen, 1979:367 for a survey of these studies). A more promising approach seems to lie in Piore's (1975) conception of "mobility chains". He argues that the threefold divisions between a secondary and a primary sector, with the latter split into an upper and a lower-tier, reflect differences in

"mobility chains", and it is these differences which are each sector's defining characteristics (p.128). Mobility chains are the lines of progression or sequences of jobs that people hold. Thus, the critical distinction between the primary and secondary sectors is that the mobility chains of the former constitute some kind of career ladder along which there is progress toward higher-paying and higher-status jobs, whereas those of the latter do not. This is true in both the upper and lower tiers of the primary sector, and constitutes the rationale for speaking of the two as comprising a single sector. In the secondary sector, by contrast, jobs do not fall into any regular progression of this kind; they are held in more or less random fashion, so that, for example, a worker coming into a job may take the place of another person moving to the job which the first worker just left. Piore suggests that the underlying determinant of the division into different types of mobility chains is the structure of technology. In particular, he distinguishes between a specialized, capital-intensive technology and a more general technology in which the work is less finely divided into a set of individual, carefully defined tasks. In the second type, considerably less capital equipment is employed in production. He identifies several factors that determine the type of technology employed, including "stability","certainty of demand for the product", and the degree of "standardization". The capital-intensive technology dictates a core of jobs that lend themselves to the building of lower-tier mobility chains: the jobs at the bottom of these mobility chains can, but need not, be detached and formed into a secondary sector. The capital-intensive technology which generates the core jobs also requires a much smaller complement of workers, which lends itself to the

establishment of upper-tier mobility chains. The more general technology, Piore argues, is typically translated into secondary sector jobs (1975: 141-143).

The concept of internal labour markets was first developed by institutional economists in the 1950s. It refers to "the complex of rules which determine the movement of workers among job classifications within administrative units such as enterprises, companies or hiring halls" (Dunlop, 1966:32). These markets are distinguished from "external labour markets", where pricing, allocating, and training decisions are controlled directly by market forces.

In contrast to the dual labour market tradition, the empirical literature on internal labour markets has not sought to classify the economy as a whole into sectors; instead, it has taken a more disaggregated approach and examined specific internal labour markets, such as those in manufacturing plants, union hiring halls, scientific institutions, and banks. A general model of how internal labour markets relate to the operations of the economy as a whole has not, as yet, been developed very far.

Internal labour markets are generally seen to be of two major types. In the first, (Kerr, 1954), the internal market is usually equated with a particular firm. Entry is controlled by the firm, and workers tend to be promoted from the entry job classifications to higher-level jobs in the firm along orderly lines of progression. In the second, (Doeringer and Piore, 1971), the internal market comprises a particular occupation group, usually a craft occupation. Here, entry is generally controlled by members of the occupational group. In this latter kind of market, the job security derives not from the individual employer, but from the

occupation's skill, the competitive supply of which is controlled by the occupational group.

Traditional views of labour markets focus on external markets, in which competing (potential) employers face competing (potential) workers. But the pervasiveness of large corporations with internal markets makes this view incomplete. According to Edwards (1975), internal labour markets exist in "big firms", and the analysis of these markets views the social relations in the workplace, in part, as a system of labour exchange within the firm, regulating promotion, job placement, the setting of wage rates, and so forth. In some cases, workers may have the right to "bid" for jobs when a vacancy occurs; in most cases, however, placement and promotion is based on seniority. More generally, firms establish promotion ladders. New workers are recruited from the "external" labour market primarily into bottom-rung jobs, and most higher vacancies are filled "internally" from the pool of workers already employed by the firm. In this case, the worker's work record and recommendations from supervisors, as well as his or her formal training, skills, and seniority, determine whether he or she gets the job (p.5,6).

Althauser and Kalleberg(1981) argue that there is a need to redefine labour market types as there are many inconsistencies in researchers' attempts to operationalize the original, broad definitions of them. In particular, the original definitions tend to be multidimensional, including employment outcomes, such as earnings, along with worker labour market characteristics. Althauser and Kalleberg prefer to redefine internal labour markets so that jobs would be included in an internal labour market, if and only if they "form a ladder, with entry limited to the

bottom and where movement upward is accompanied by progressive development of skill and knowledge" (pp.145). Furthermore, these authors distinguish two subtypes of internal labour markets: firm internal labour markets and occupational labour markets. Finally, they identify three types of external labour markets: (a) occupational labour markets, which are characterized by specialized skills, but an absence of movement up an occupational ladder; (b) firm labour markets, which contain jobs whose occupants enjoy vertical tenure, although these jobs are not arranged on any job ladder; and (c) secondary labour markets, which lack the elements that define the other markets, namely job ladders, development of skill or knowledge, significant investment in training by either employer or employee, limited entry or notable entry requirements, and options for firm-specific tenure. While Althauser and Kalleberg's redefinition of internal labout markets hold some promise for future research, it needs yet to be empirically tested or evaluated.

Dual Economy and Dual Labour Market Theories

There appears to be some confusion in the literature as to the conceptual distinctions and theoretical linkages between labour markets and economic sectors. Where some theorists and researchers tend to treat labour markets as corresponding quite directly to sectors of the economy (for example, see Tolbert, et al., 1980), others argue for a less-than-perfect correspondence between output markets and labour sectors, i.e., that the two should be conceptualized independently of one another (see, for example, Piore, 1977; Hodson and Kaufman, 1982; Althauser and Kalleberg, 1981). This tendency to confuse the two constructs with one another has led to some unsuccessful operationalizations of the dual economy, in which industrial characteristics are combined with labour force characteristics and outcome variables (such as earnings) to produce a summary measure of the

dual economy (see, for example, Oster, 1979; Tolbert, et al., 1980).

An examination of the theoretical relationship between the dual economy and dual labour market models may help to clarify the connections between them. Two points seem clear. First, economic sectors are products of the historical development of industrial capitalism, and can be viewed as logically prior to labour market categories, which are aspects of job conditions. The economic characteristics of the sectors have an important impact on the characteristics of jobs which are located there. For example, firms in the core sector are characterized by a bureaucratic control structure and a capital intensive technology, resulting in more primary sector and internal labour market jobs. The secondary labour market represents a continuation of the characteristics of a more competitive, small business capitalism (Edwards, 1975). Second, there is an imperfect empirical correspondence between economic sectors and labour markets, although the actual degree of overlap between the two remains an open question (Hodson, 1979; Edwards, 1975; Piore, 1977; Althauser and Kalleberg, 1981; Hodson and Kaufman, 1982). Specifically, the literature suggests that most secondary jobs are located in the periphery, although there are some in the core, and most primary jobs are located in the core, although there are some in the periphery. Likewise, most internal labour markets are described as being in the core, although there are also some in the periphery, and most external labour markets are described as being in the periphery, although there are also some in the core.

If the core sector differs from the periphery in the disproportionate numbers of primary and internal labour markets jobs which the former contains, then what can be said more precisely about the

characteristics of jobs in each of these two sectors ? The labour market literature suggests that the most important characteristics that distinguish primary from secondary jobs are working conditions, opportunities for advancement and, above all, job stability. That is, jobs in the core sector can be distinguished from those in the periphery by their better working conditions, opportunities for advancement, and job stability. If this is true, then what can be said about the characteristics of workers hired to fill the jobs in the core and periphery sectors? Gordon (1972) argues that employers in the core attempt to hire workers with those characteristics valued most highly in the job--stability and tenure or job experience. Being unable to measure these things adequately, however, employers rely on educational credentials as screening devices, on the assumption that diligence at work depends upon the same characteristics as success in school. Thus, formal education in the core sector is widely used to mediate individual access to different job ladders.

The segmented labour market approach has been the subject of considerable debate because of its essentially descriptive nature and the claim that it is not neoclassical. It has been labeled as "sketchy", "vague" and "diverse", with descriptions and taxonomies prevailing over theoretical model development. Cain (1976) argues that labour market theories "are stronger in their criticism of neoclassical theory than they are in advancing a coherent self-contained theory as a replacement" (p.1224) and, in lengthy critique, he argues that there are fewer disagreements between neoclassical economics and the labour market approach than proponents of the latter have suggested. Rosen (1974) also emphasizes the similarities between the segmented labour market approach and the basic postulates of economic

theory, and Wachter (1974) argues that many of the findings upon which it is based can be accommodated to the neoclassical framework. At the same time, Wachter argues some of the findings are not supported empirically. For example, he finds considerable mobility between primary and secondary sectors. Further, he argues that, even though different parameters characterize the populations in each labour market, it has not been established that different economic processes occur in different labour markets.

Worker Outcomes

The third element which Hodson and Kaufman (1982) identify in the dual economy model is a set of outcomes for workers which result from their participation in the labour market. Specifically, they identify three sets of outcomes for labour--the likelihood of mobility between sectors, the condition of labour in terms of various tangible and intangible rewards, such as earnings, and the consciousness of workers (pp.730). The following discussion will focus on the second of these outcomes, and more particularly on earnings.

The core sector is generally described as being distinguished from the periphery by the relatively higher earnings paid to workers. If this is true, then what factors might account for the relatively greater capacity of core firms to pay their workers high wages and salaries? O'Connor (1973:19) argues that earnings in the periphery are determined by "total demand in the economy as a whole". Increases in periphery sector money wages are attributable to inflation, not to technical progress or improvements in productivity. By contrast, the core sector is composed of large, oligopolistic industries which can often set prices without fear of open price conflict. Thus, wage increases can be passed

along at rates equal to productivity, while the competitive firm is often forced to lower prices, rather than to increase profits or wages. In some cases, the oligopolistic firm may be forced to raise wages even above productivity gains, (e.g., responding to a union's demands for a pay raise) paying for them by cutting into monopoly profits or by boosting the price of their products. The highly competitive firm is rarely in such a position (Bluestone, 1973:99).

Bluestone (1973) notes that a highly concentrated industry per se is not a necessary and sufficient condition for a higher wage scale, for there is nothing inherent in the size of a firm or in the absence of product market competition which accounts for better wages. Instead, oligopoly provides a "permissive economic environment", within which other forces can generate higher wages. This environment consists of capital-intensive production possibilities, the ability to set prices based on product demand conditions, high-public visibility, low firm entry, and the opportunity for strong unionism (p.99).

Unionism plays a central role in determining inter-sectoral wage differentials. A number of studies have shown that higher wage rates are associated with (1) a relatively high degree of oligopoly, (2) high profit rates, and (3) strong unions (see, for example, Bowen, 1960). These forces, however, do not act independently of one another. According to Bluestone, "higher product market concentration and high profits provide the footing for a permissive economic environment in which strong unions can reap economic and social rewards for their members" (1977:101). Through collective bargaining and the threat of strike action, these unions can transform the capacity of industries to pay higher wages into

real wage advances for their members. Likewise, O'Connor (1973) argues that ultimately it is the collective power of organized labour that wrests higher wages from monopolistic corporations.

In the periphery sector, unions tend to be weak and ineffective, if they exist at all. In contrast to the core, the periphery to some extent represents the end result of a "repressive economic environment" (Bluestone, 1973:101). When industries are marked by easy entry, fierce national and international competition, highly elastic product demand, low profits and low productivity, union organization is stymied and the pressure for higher wages is low. In fact, the ability of many low-wage industries to pay adequate wages without drastically cutting employment is open to question.

According to Kalleberg, et al. (1981), good reasons exist for expecting unions to locate in the core sector. They write:

> Unions are more likely to organize in firms with a large number of employees than in small firms. Further, once industrial markets become concentrated, unions often collaborate with powerful employers to create higher entry barriers for nonunion sources of labor. High volumes of profits, assets, and sales (i.e., economic scale) encourage unionization by creating a larger economic pie for employers and workers to divide, thus providing an incentive for worker organization. Unions are also important mechanisms for ensuring that workers benefit economically from increases in productivity which may be due to more capital intensive forms of production. Finally, industries that engage in state-sponsored production are likely to be unionized because of the existence of a relatively stable supply of labor in those industries, a precondition for effective organization. (pp.658)

Although the literature is inconclusive as to the importance of unionism for inter-sectoral wage differentials, Kalleberg, et al. conclude that the effects of economic segmentation on wages must be interpreted in light of

differences among the economic sectors in the strength of their unions.

Related to the overall earnings advantage posited by dual economy theorists for workers in the core sector, it may also be that core workers tend to be remunerated according to somewhat different principles than periphery workers. Specifically, it is frequently argued that workers in the core tend to be paid in some relation to their employment characteristics, such as education, training, experience, seniority and employment stability, whereas workers in the periphery are not. Gordon (1972:50) suggests that, in the periphery, hourly wages are largely independent of individual characteristics, and that workers respond to this by switching jobs frequently, as they suffer little or no economic consequences for doing so.

Social Division of Labour

The fourth element involved in the dual economy model which is identified by Hodson and Kaufman (1982) concerns gender, age, and racial/ethnic divisions in the labour force, i.e., the social division of labour. Since the core sector requires a workforce that is stable and trainable, while the periphery requires one that will accept inferior working conditions, lower pay and a higher risk of work instability, the suggestion is that those persons who belong to social categories which have historically occupied the weakest positions in the labour market will tend disproportionately to be recruited into the core sector. Beck, et al. (1980), for example, argue that, for this reason, women, the young, and members of racial/ethnic minorities tend to be drawn into the periphery, and that being employed in the periphery further weakens a worker's labour market position, since workers there are less likely to have stable employment

histories or to have acquired substantial skills as part of their work experience.

By what mechanism do members of different gender, age, and racial/ethnic categories tend to be allocated to different economic sectors? One argument is that this occurs in a process of "statistical discrimination," whereby persons belonging to social categories whose labour market positions have been relatively strong in the past tend to be preferred for the better, i.e., primary, jobs. According to this view, persons who possess certain highly visible attributes thought to be associated with employment stability and trainability (e.g., being male, relatively young, white, fairly well educated, well groomed, high paper-and-pencil test scores, etc.) tend to be selected first for primary (and, hence, core) jobs, leaving the rest more likely to be selected for secondary (and, thus, periphery) jobs. This happens, the argument continues, because it is a relatively inexpensive way to make hiring decisions, not out of any universal or strong conviction that men always perform better than women, that the prime-aged always perform better than the middle-aged or elderly, etc., although the result may turn out to be much the same. So, women tend disproportionately to be assigned to secondary (periphery) jobs at the beginning of their careers or upon re-entry to the labour force and, once there, it becomes even more difficult for them to move into primary (core) jobs. Discrimination may thus operate to some extent by assigning individuals to "bad" context, rather than by overt means (Kalleberg and Sorenson, 1979: 370).

Piore (1977:95) argues that discrimination of any kind increases the size of the captive labour force in the secondary sector, and thus lowers the

wages which their employers must pay. This gives such employers an economic stake in its perpetuation. Primary workers also have a stake in discrimination, as it limits their competition and raises their wages. Discrimination is not generally of economic value to employers of primary workers, since it forces them to pay higher wages. Through statistical discrimination, however, these higher wages are at least partly compensated for by the reduced cost of screening job candidates and the perceived higher work quality achieved, so that the interest of primary workers in such discrimination tends to be shared by employers generally.

The State Sector

While the dual economy has been the predominant conceptualization employed by U.S. segmented economy theorists, there are a number of reasons why it might be useful to treat the state as a sector separate from the core in Canada. First, while under 20 per cent of the labour force in the U.S. is employed by the state (Hodson, 1979) the corresponding figure is closer to one-quarter in Canada (Statistics Canada, 1978). Second, government ownership of business enterprises (e.g., crown corporations) is much more extensive in Canada, with crown corporations dominating much of the utilities and transportation industries, as well as operating the mail service. Third, men and women are differentially allocated to the state sector in Canada. Boyd and Humphreys (1979:44) find that, of native born full-time paid workers, 12.6 per cent of the males and 25.9 per cent of the females are in the state sector.

To date, very little theoretical work has been done which treats the state as a sector distinct from the core and the periphery. In Canada, the services provided by government are diverse in nature, and are carried

out by various administrative bodies. It is possible to distinguish two separate, but related, government components involved in the production of goods and services that are organized by the state--(a) public administration, defense, and government services, and (b) state-regulated government enterprises. The first covers establishments primarily engaged in activities that are basically governmental in character. This includes those arms of federal, provincial and local governments which are primarily engaged in public administration, such as enacting legislation, enforcing and administering the law, collecting public revenues, and controlling the disbursement of public funds (Canada, 1970[a]:42-43). Also included are government services, such as health, social welfare, and education, which are usually financed out of ordinary revenue. While nominal fees are charged for some general community services, for the most part there is no direct relationship between the taxes and levies paid by an individual and the use or benefit the individual derives from this service (Canada, 1973a:17). The second is composed of state-regulated government enterprises involved in

> the production of economic goods and provision of services for sale, at a price to the consumer which is intended to compensate wholly or largely for their costs and in some cases yield a profit. These activities are usually carried out by a crown corporation or special agency of the government having specific powers and being subject to varying degrees of financial control by the government and of public accountability (Canada, 1973a:17).

These enterprises were established by political decision-making bodies, and operate under a separate and clearly defined mandate. They were initially created as monopolies in response to a popular demand for services, such as telephones, electric power, transportation, etc., under

circumstances where private enterprise could not be expected to do so in a way that did not conflict with the public interest. In the last two decades, however, Berkowitz (1979) notes that crown corporations, especially in the west, have begun to expand into new spheres of activity or to increase the scale of their activities in old areas to the point that they have started to operate in direct competition with private enterprise.

How can the state be then characterized? On the whole, it is comparable to the core in many important ways. It has large bureaucratic structures, sophisticated internal labour markets, stability of employment, job security, and high rates of unionization. There are, however, important differences between the public administration and service components on the one hand, and the state-regulated component on the other hand. In the former, the ratio of capital to labour is relatively low, and production growth depends mainly on increased employment. Thus, production depends on budgetary priorities and the government's ability to mobilize taxes (O'Connor, 1973). In the latter, the activities of crown corporations and other government regulated enterprises are of an outright commercial or industrial nature, whereby goods or services are produced for sale on the open market at a price related to the cost. These enterprises maintain an "independent system of accounts, have a relatively autonomous management in the conduct of routine, day-to-day operations, and are staffed by personnel not normally subjected to the statutory requirements governing employment in the general public service, such as norms that govern hiring, promotion, transfer and other personnel decisions" (Canada, 1973a:17). Despite this, and unlike most businesses in the private sector, they are subject to state regulation

with respect to the overall conduct of their affairs and the prices they can charge. For example, utilities and railroads must all have government approval for rate increases. Thus, their profits are controlled.

Earnings in the State Sector

In the dual economy model, the state has typically been treated as a component of the core with average earnings comparable to those elsewhere in the core. At the same time, the factors that determine earnings in the state may differ from those in either the private component of the core or the periphery. For one, O'Connor (1973:30) maintains that, in the U.S., there is a general tendency for state earnings to be driven up to the level in the core (which he treats as separate from the state). First, workers employed by state contractors and state agencies typically receive union pay scales, as in the core. Second, many state and local government employee associations and unions have considerable bargaining power, and seek to enforce wage and salary scales commensurate with those in the core. As for the state vs. the periphery, market forces do not determine earnings in the state. According to O'Connor, earnings in the state are determined politically, and a floor is thus placed on the average pay scales--a floor that is absent in the periphery sector.

Gunderson (1979:230) argues that, in Canada, the basic difference between the public and private sectors in the factors which determine earnings is that, in the former, the profit constraint is replaced by an ultimate political constraint. He identifies a number of political forces that influence public sector earnings indirectly through institutional channels which ultimately affect the framework within which bargaining

occurs. These include such matters as the right to organize, the allowable number of bargainable issues, appropriate dispute settlement procedures, civil service regulations, comparability earnings surveys and appropriate earnings criteria and Gunderson suggests that these impart an upward bias to earnings. In addition, other factors, such as wage-price guidelines, reduced intergovernmental transfers, and decisions to curb the growth of the public sector, can affect public sector earnings.

There is no empirical research for Canada which permits any very satisfactory comparison between state and core sector earnings. There is evidence to suggest, however, that public administration employees earn on the order of 5-15 per cent more than private sector employees (see Gunderson, 1977, 1978, 1979). This difference comes about, Gunderson argues, partly through a pure earnings advantage in the public sector, and partly through differences between the underlying earnings determination processes of the two sectors. For example, public administration employees have greater returns to education than do employees in manufacturing, and this fact accounts for a major part in the over-all earnings differential between the two (Gunderson, 1979). Further, the earnings advantage tends to be larger in the junior levels within an occupation, and smaller (or even negative) at the more senior levels (Gunderson, 1977, 1979), and is greater for females than for males (Gunderson, 1979; Smith, 1977b).

Segmented Economy Theory and Earnings Discrimination

This review of segmented economy theory suggests that it is not sufficiently well developed to be considered a satisfactory alternative to neoclassical economic theory. The model is sketchy, poorly specified, and

suggests only vague hypotheses which might be tested. Perhaps it will not ultimately come to be seen as an alternative approach, but rather as a critique of the neoclassical model. Regardless of its role in economics, however, it is potentially useful to sociology. For one thing, it leads us to consider that analyses of earnings determination which assume homogeneous market conditions and estimate the earnings returns to individual characteristics, such as education, social background, and work experience, may produce results which are misleading or inaccurate, because of misspecification of the economic structure. For another, it suggests that, by incorporating structural variables, such as economic sectors, into a model of earnings determination, we should be able to explain better how it is that women earn much less than men. It is from this perspective that our research program proceeds.

This research has a twofold purpose. The first is to develop a model of earnings determination for all males and females in the Canadian labour force, which will include human capital variables, social background variables, occupational status, a measure of unionization and a measure of sectoral attachment. Using this model, it will be possible to arrive at an estimate of the extent of gender discrimination in earnings in Canada. The second purpose is to use the approach suggested by segmented economy theory to explore a more structural interpretation of discrimination. Segmentated economy theory suggests that sex differences in earnings and in the earnings attainment processes of men and women are influenced importantly by their sectoral attachments.

As previously discussed, the argument from neoclassical economics is that discrimination in the labour force represents a short-run imperfection in an otherwise open, competitive system of reward allocation. In

marked contrast, the view from segmented economy theory is that at least some discrimination is embedded in the structure of production in capitalist society. How, then, might this latter assumption contribute to a further understanding of the earnings gap between the sexes? As outlined above, segmented economy theory suggests that the economy consists of two or three economic sectors which differ in the average earnings of their employees, such that the average level of earnings in the state will equal those in the core, and that the average earnings in both of these will be substantially greater than those in the periphery. Further, it is suggested that the sectors differ in the processes by which earnings are determined. In the core and state sectors, for example, the expectation is that workers will be more likely to be rewarded for their human capital factors (such as education, training, seniority, experience and stability) than are workers in the periphery. In particular, the differential returns to education across economic sectors has been the focus of several recent studies of economic segmentation (see, for example, Stolzenberg, 1978; Beck, et al., 1978). Also, Kalleberg, et al. (1981) suggest that unions are better able to bargain for higher wages and salaries in the core and state than in the periphery.

There have been a number of recent attempts to include structural characteristics of labour markets in models of earnings determination (see Stolzenberg, 1975, 1978; Bibb and Form, 1977). Beck, et al.(1978) are the first to compare the process by which earnings are determined in the core and periphery sectors in the U.S.[1] They find sectoral differences in the processes by which earnings are determined. In particular, their analysis indicates that "schooling, net of degree levels, has an important positive effect on annual earnings in the periphery, but no

significant effect in the core. In contrast, the net effects of level of degree attainment are significant and positive in the core but not in the periphery." In a later study, however, Beck, et al. (1980) find that both males and females have greater dollar returns to schooling and experience in the core than in the periphery, and that the difference in rates of return appears to be greater for males than for females. For Canada, Boyd and Humphreys (1979), with a subsample of native-born, full-time workers, find that the income attainment process of males in the core does not differ from that of males in the periphery, whereas females in the core receive a higher rate of return for their years of experience and education than do females in the periphery.

While fragmentary, and not entirely consistent, there is evidence to suggest that earnings returns to human capital investments differ across economic sectors. If this is the case, then what does this mean for the male-female earnings gap? Beck, et al. (1980) argue that the male-female earnings gap would be reduced if all females and males were evaluated at an homogeneous rate, noting that the ratio of female to male earnings would increase from .43 to .51 if all females and males were remunerated according to the criteria used for each in the core sector. So, they suggest that segmentation exacerbates the earnings inequality between the sexes.

Segmented economy theorists argue that there are two points at which discrimination occurs: differential allocation of the sexes to sectors, and different earnings determination processes for each sex within each sector (Beck, et al., 1980). Using a dual economy approach, Beck, Horan and Tolbert (1980) find evidence in the U.S. of the differential allocation

of minorities to sectors. For example, they report that being female reduces the likelihood of being in the core by 24.5 percentage points. Is this differential assignment due to direct labour market discrimination or to past discrimination which results in minorities having lower levels of human capital? They reason that, if differences between the sexes in human capital factors, such as schooling and experience, are taken into account, and the gender effect remains undiminished, this is evidence of discrimination in the assignment of minority labour to economic sectors. If the gender effect disappears, however, then they argue that this is evidence that minorities are channelled into different sectors on the basis of differences in human capital factors. When they take these differences into account, using a U.S. sample, the gender effect remains, suggesting that there is differential assignment to sectors on the basis of sex alone. They then attempt to estimate the cost of this differential assignment by computing an adjusted earnings level for each group, by estimating the average earnings of males and females in each sector under the assumption of no differential assignment to sectors. They find that, with no differential assignment, males would experience a net loss in earnings, while females would have a net gain. They conclude that:

> If males and females were distributed proportionally across both economic sectors--without change in the relative size of the sectors, without change in the average human capital investment of the groups--and without change in the rates of return to human capital, there would be an increase of about 9 per cent in the earnings of females and a corresponding decrease in the earnings of males. Thus, differential sectoral allocation does play an important part in earnings discrimination (Beck, et al., 1980:119)

In an examination of the allocation of the sexes to economic sectors in Canada, Boyd and Humphreys (1979) find no differential alloca-

tion of the sexes to the core and periphery sectors. When they distinguish between core and "public administration", however, they find disproportionately more males in the former and more females in the latter. Since their sample consists only of native-born, full-time workers, however, it is impossible to generalize their findings to the labour force as a whole.

Discrimination in earnings may also occur through the differential evaluation of human capital for males and females within each sector. In Chapter 2, it was demonstrated that the earnings determination process differs by gender (see, for example, Featherman and Hauser, 1976: Treiman and Terrell, 1976; Goyder, 1981). Segmented economic theory takes this one step further and argues that there is a differential evaluation of workers' credentials by gender within each sector of the economy, and there is some support for this in the literature. Boyd and Humphreys (1979) find that the differential evaluation of characteristics by gender within labour sectors is a major source of the lower income of women in Canada. Three specific findings emerge from their work. First, across all industrial sectors, full-time native-born women get lower rates of return to their years in the labour force than do full-time, native-born men. Second, women in the periphery and in the core receive lower returns to their current occupational status than do men. Third, in contrast to workers in the core or the periphery, men and women in public administration tend to have similar returns to their education and current occupation status. Beck, et al.'s (1980) findings on the differential evaluation of human capital for males and females within sectors are similar. Using a substitution of means technique, they calculate the expected earnings for females on the assumption that they are remunerated on the same basis as males within each sector. They find that

in the U.S., for females there is a $3,103 cost to being female in the core and a $2,153 cost in the periphery.[2] Both Boyd and Humphreys and Beck, et. al. suggest that discrimination is more severe in the core than in the periphery.

This review of the segmented economy literature suggests several possible sources of male-female differences in earnings. One purpose of this research is to consider a number of hypotheses which are part of segmented economy theory and, in particular, to address the following questions:

(a) How do economic sectors differ in their employment characteristics and in their labour force compositions?

(b) Are males and females differentially allocated to the three sectors and, if so, what is the consequence of this for male-female differences in earnings?

(c) How do the sectors differ in the ways in which worker characteristics are remunerated? Specifically, are workers in the core and state more likely to receive economic returns to their human capital factors (such as education, seniority and stability) than are workers in the periphery?

(d) Finally, within each sector, are males and females differentially rewarded for their earnings-related characteristics, and if so, to what extent does this contribute to male-female differences in earnings?

FOOTNOTES

1 Data are from the 1976 Current Population Survey (March Supplement). From the overall CPS sample, Beck, et al. selected a subset of workers who were civilians, 16 years or older, and employed either part- or full-time or, only recently unemployed.

2 However, they do not control for occupation or hours worked in their earnings determination model, as they argue that it is partly through differential occupational placement and differential access to full-time employment that discrimination in the labour force exists. If they control for these, they argue, they would restrict the analysis and censor estimates of the differential returns to human capital, thereby reducing the apparent extent of discrimination against minority labour in the marketplace.

CHAPTER 4

METHODOLOGY

Introduction

The purpose of this chapter and the next is to describe certain important methodological aspects of this dissertation. One of these is the systematic evaluation of different solutions to the problem of missing information in the data set; another is the measurement of the variables employed in this investigation (including a number of important "new" variables, namely economic sector, unionization and career interruption which, to date, have not been considered as sources of male-female earnings inequalities in Canada). Chapter Four begins with a description of the data set to be used here, and devotes considerable attention to procedures for dealing with missing information--a major problem with the data set. Chapter Four also describes the measurement of the variables to be employed in this investigation, except for economic sector. Chapter Five deals solely with the attempt to develop a measure of economic sector.

The Data Set

The data for this investigation come from a national survey conducted to study social mobility in Canada. The Canadian Mobility Study (CMS) was funded by a Canada Council research grant to Professors Frank Jones and Peter Pineo at McMaster University, John Goyder at the University of Waterloo and Monica Boyd, Hugh McRoberts and the late John Porter at Carleton University. The survey was administered by Statistics

Canada as a supplement to their July, 1973 Monthly Labour Force Survey (LFS), and the data were coded and edited by Statistics Canada and released to the principal investigators as a set of individual records.

In the approach taken and the type of data collected, the CMS is comparable to the 1962 and 1973 studies of occupational attainment in the United States (see Blau and Duncan, 1967 and Featherman and Hauser, 1976). Respondents were asked about their backgrounds (parental birthplace, number of brothers and sisters, their ordinal position in the family, where they were living at age 16, the current occupation of the head of the household, and their parents' levels of education) and their own social, educational and occupational characteristics (marital status and age at first marriage, educational attainment, nature of first full-time job and when it was begun, length of time in the armed forces, job in 1962-63 and present job and income in 1972). There are a number of ways, however, in which the Canadian study differed significantly from its American counterparts. First, the Canadian experience of continued immigration and its traditions of bilingualism and multiculturalism necessitated the inclusion of additional questions on languages spoken, ethnicity and immigration background. Second, while most occupational attainment mobility studies have sought only to investigate the occupational attainment of males, females were included in the CMS, and this necessitated the re-working of some standard status attainment questions and the addition of others (questions on career interruptions and children, for example.) For a copy of the CMS interview schedule, see Appendix A.

The Sample Design

The Labour Force Survey sampling procedures determined the

population and sample for the CMS and, so, the sample design for the LFS will be described in some detail.[1] The target population from which the LSF sample is drawn is the civilian non-institutional population of Canada, excluding the Northwest Territories and the Yukon, who are 14 years of age and over.[2] The sample is a multi-stage stratified probability sample of this population. The basic unit of the sample is the household, and approximately 35,000 households were sampled at the time of the CMS. Participating households are divided into six panels, with each panel remaining in the sample for a period of six consecutive months. Each month, a new panel rotates into the sample, and the panel in its sixth month rotates out.

The Labour Force Survey sample is drawn in two parts: Self-Representing Units and Non-Self-Representing Units. Each will be briefly described below. Non-Self-Representing Units are those units which lie outside Census Metropolitan Areas and other cities over 15,000 population, where it is considered impractical to draw a sample due to the time and cost factors involved in interviewing. Thus, a four-stage sampling design is employed. At the first stage, the area is divided into strata and then into primary sampling units (PSU). These are then sampled, and those PSU's selected are said to "represent" other units which were not, hence the term "non-self-representing". At the second stage, the selected PSU's are divided into segments composed of one or more Census Enumeration Areas. At the third stage, the Census Enumeration Areas are sampled, and those segments chosen are broken down into clusters of four to five households. At the fourth stage, households within clusters are selected. The Self-Representing Units are urban areas

with populations of 15,000 persons or more, or areas of unique or special interest. The boundaries of these areas are the same as those used for the metropolitan areas in the Census. In the larger cities (units), the city is broken down into segments which, in turn, are sampled independently within each sub-unit. Households are then selected from each chosen segment.

The basic design of the Labour Force Survey is such that the data are self-weighting by province; however, due to the very large differences in population size among the provinces, each province is sampled at a different sampling ratio. In order to make inferences to the country as a whole, then, it is necessary to weight each case by the inverse of the provincial sampling ratio. Statistics Canada also uses three other weights in order to arrive at an overall weight for the cases in the sample. The second weight is a "balancing for non-response" weight, and is calculated using "balancing units", which are urban or rural portions of primary sampling units or sub-units (compact areas of about 15,000) within self-representing units. The third and fourth weights are the "urban-rural factor" and the "age-sex factor", the computations of which are complex and will not be described in detail here. Basically, sample proportions are compared with census population estimates in order to create correction factors for "population slippage", which refers to changes in the population occurring since the basic design of the sample was established. The final weight placed on each record is the product of the above four weights.[3]

Field Procedure

The CMS survey instrument was dropped off at the time of the July, 1973

Labour Force survey interview and picked up later in the week by the enumerator. At the time of the drop-off, all those eligible for the CMS survey (18 or over and not a full-time student) were left a questionnaire to complete. At a prearranged time, the enumerator called back to pick up the questionnaire. Up to three call-backs were made, except in remote areas (where a stamped return envelope was left with the respondent). Also,if the family was not found at home, copies of the instrument and a stamped return envelope were left for all family members.

It is particularly fortunate for this research that Statistics Canada also made available the LFS data on respondents who had answered the CMS questionnaire. This results in additional data on respondents, such as a variety of 1973 labour force characteristics, including employment class of worker, full- or part-time work, and the occupational 2-digit Major group and industrial classification of the job held by the respondent.

The "Gainfully Employed"

In this dissertation, an attempt is made to include all men and women employed outside the home--not just those with uninterrupted careers who work full-time (see, for example, Boyd and Humphreys, 1979). The basic reason for this is that the overall difference between the sexes in their earnings may have importantly to do with prior differences between them in their career patterns, and whether they are employed full- or part-time--points which are stressed in the segmented economy literature. No assessment of the gender earnings differential in the context of a segmented economy model, then, would be complete without a thoroughgoing analysis of gender differences in patterns of employment.

In the CMS there are 23,049 women and 21,820 men, for a total sample of 44,869, although many of these women and men are not employed in paid labour outside the home. Since this dissertation is about disparities between the sexes in paid labour, it is necessary to eliminate from the analysis those women and men who do not work for wages or salaries. Thus, a subset of the sample, called here the "gainfully employed", is selected for analysis, including only those who report either a job in the reference week (as reported in the LFS), a present occupation, or income from employment in 1972. This selection results in a sample which contains 49.7 per cent of the females and 89.4 per cent of the males, for a total of 30,945 gainfully employed respondents.

Unfortunately, it is not possible to use all those "gainfully employed" in the analysis of the determinants of earnings which is at the centre of this dissertation, as the questionnaire was mistakenly designed with improper "skip patterns", such that all those who had never had a full-time job or who had experienced a "single period of one year or more when you were not working for pay or profit" and returned part-time were skipped past the question on present occupation in the CMS (see groups 2, 4 and 6 in Table 4-1). Furthermore, a number of respondents, although employed in 1973 in the reference week, were not employed in 1972 and gave no income from employment for that year (see groups 5 and 6 in Table 4-1). It is also necessary to include in the analysis of earnings determination a measure of economic sector location, and this is only available for those respondents who were employed in the reference week, as our measure of sectoral location is based on the question on industry of employment which was asked in the LFS (see group 3 in

TABLE: 4-1

The Sample of the Gainfully Employed by Type of Information Available

	DATA AVAILABILITY			WOMEN		MEN	
Group	Income in 1972	Occupation & Industry From LFS	Present Occupation From CMS	Number	Per cent**	Number	Per Cent**
1	Present	Present	Present	5,993	52.40	14,528	74.51
2	Present	Present	Absent*	1,069	9.34	1,717	8.81
3	Present	Absent	Present	1,544	13.49	493	2.53
4	Present	Absent	Absent*	1,011	8.83	271	1.39
5	Absent	Present	Present	805	7.03	1,427	7.32
6	Absent	Present	Absent*	1,025	8.95	1,062	5.45
Total				11,447		19,498	

* Due to improper skip patterns.

** Per cent of gainfully employed.

Table 4-1). As a result, the analysis of the determinants of earnings presented below is limited to those who reported an income in 1972, who were also in the labour force in 1973 and who reported an occupation and industrial location for that year--that is, those groups 1 and 2 in Table 4-1.

There is a further problem related to using those persons in group 2 in the earnings determination analysis. These respondents (9.34 per cent of the women and 8.81 per cent of the men) reported no present occupation in the CMS, due primarily to the improper skip patterns outlined above. It seemed imperative, however, that this group be salvaged for analysis, as it contains those persons whom the theory predicts will be located in the secondary labour market in the peripheral sector of the economy. To salvage them, it is necessary to arrive at some measure of their current occupational status, and the attempt to do so is presented later in this chapter.

Missing Data

It is argued here that it is necessary to keep all those who are employed in the labour force in the analysis of earnings differentials between the sexes. Most researchers, especially those with large samples, run their analyses using a listwise deletion of cases, eliminating all those respondents who have missing values on <u>any</u> of the variables of interest. While this technique has a number of advantages, there are also certain disadvantages attached to it, not the least of which is that the presence of non-trivial amounts of missing data could mean that the sample of cases created through listwise deletion is not representative of the larger sample of which it is a part. Consequently, it may not be

possible to make inferences about the population based on sample data when listwise solutions are run.

The use of listwise deletion is problematic for the CMS data, as there are very high rates of non-response for part-time workers on critical questions. Boyd and Humphreys (1979:20) point out, for example, that "the rates of non-response to the current occupational question in the Canadian National Mobility survey for full-time and part-time workers were 12.7 and 20.6 per cent respectively for native-born males age 25-64 and 20.0 and 42.0 per cent for females respectively". To include only those persons in the labour force with no missing data (as in a listwise deletion) could severely bias any results obtained.

What, then might be the best solution to the problem of missing data in the present analysis? Kim and Curry (1977) compare the relative advantages and disadvantages of a number of alternative procedures for handling the problem of missing data in multivariate analysis, and the logic of their arguments will be applied to arrive at some solution to the problem of missing data here. There are basically three approaches to handling missing data; listwise deletion, pairwise deletion and replacing missing values with some estimate from available information. Of these, listwise and pairwise deletion are the simplest. In pairwise deletion, when a value is missing, that case is eliminated from calculations involving that variable only. Whereas, in listwise deletion, when a value is missing, that case is eliminated from calculations involving all variables. The basic problem with listwise deletion originates in the relatively greater loss of data as compared with what happens with the other two methods, whereas pairwise deletion gives rise to

potential problems of inconsistency in the correlation and covariance matrices in multivariate analyses (Kim and Curry, 1977:216).

If listwise deletion can be ruled out as an adequate means of handling missing information, what, then, about pairwise deletion as a useful procedure for handling the problem of missing data? Kim and Curry suggest that pairwise deletion with a large data set with medium-sized correlations and random missing values need not bias the results, and is clearly the preferred method of handling missing data (p. 227). The data set clearly meet the first two criteria (i.e., large data set, medium-sized correlations) and, if it could be shown that the missing data are randomly distributed, then the pairwise procedure for handling missing data might be an adequate solution to the problem here.

Is the pattern of missing data in the CMS random? Cohen and Cohen (1975) suggest that it is convenient to represent the existence of missing data with dummy indicator variables (that is, for each variable create a bivariate code, present-absent). Using these, there are two tests for random missing data that can be made. The first, and less critical of the two, involves an examination of the correlation matrix for the set of missing-data indicator variables, which serves as a way of ascertaining whether there is any unusual clustering between missing values for pairs of variables. Correlations between any two present-absent dummy variables may indicate non-random missing data and, as can be seen in Table 4-2, there is a clustering of missing values between first and present occupation, and between each of these two variables and years in the labour force. This is not surprising, as all three variables were skipped if a respondent had never worked full-time in the labour

TABLE: 4-2

Correlation Matrix of Dichotomous Missing Indicator Variables**

	1	2	3	4	5	6	7	8
1 Present Occupation	1.000	.612*	.091	.158	.459*	.093	.127	.152
2 First Occupation		1.000	.113	.118	.530*	.119	.073	.069
3 Hours Worked Per Week			1.000	.376*	.073	-.020	.053	.075
4 Weeks Worked Per Year				1.000	.129	-.002	-.043	.080
5 Years in the Labour Force					1.000	-.020	.169	.142
6 Education						1.000	-.008	.115
7 Marital Status							1.000	.109
8 Career Interruptions								1.000

N = 2,162

* Denotes non-trivial clustering of missing values.

** Based on a 10 per cent sample of the Gainfully Employed.

force. There is also clustering of missing values between weeks worked per year and hours worked per year, as persons who had not worked any weeks in 1972 were instructed not to answer the question on hours worked per week. Thus, the first test shows possible clustering among missing values of the independent variables.

The second, and more important, test of the randomness of missing values involves regressing the dependent variable, income, on each of the independent variables (each dummied with respect to present-absent). In this test, the regression coefficient indicates the magnitude of the difference in income between those with and without data on the independent variable missing, and the F-ratio can be used to test for the significance of this difference. Table 4-3 shows that there is a pattern of missing data between income and first and present occupation, years in the labour force and career interruptions (based on a strict criterion of significance of .001).[4]

Kim and Curry (1977:222) suggest that, if the pattern of missing data does not deviate significantly from the random model, the easiest options to consider are listwise and pairwise deletion of missing data (see also Donner, 1982). However, it has been shown that the missing data in the CMS violate the assumption of randomness, so that the third procedure suggested by Kim and Curry--the replacement of missing information with an estimate of its true value--should be considered. The simplest example of this technique is when the (arithmetic) mean value for a variable is used in place of a missing value on that variable. This will have the general effect of reducing the variances of variables treated this way and, typically, of reducing their correlations with one

TABLE: 4-3

Regression of Income on Selected Dummy Data Indicator Variables on a Ten Per Cent Sample of the Gainfully Employed *

	Regression Coefficient	F Statistic	Significance Level
Present Occupation	1881.868	58.319	.000
First Occupation	1144.110	16.498	.000
Weeks Worked	1417.539	8.769	.003
Years in the Labour Force	1582.399	32.967	.000
Education	1316.534	2.441	.119
Marital Status	701.977	.349	.555
Career Interruptions	1421.219	15.261	.000

* This was done using single variable regression

another and with other variables.

Table 4-4 presents correlation coefficients for income with a number of variables important to this study under three different procedures for handling missing data. Where the correlation between missing values is small, differences in the correlations, especially between the pairwise and substitution of means solutions are minimal. Where the correlation between missing values is greater than.16, substitution of means results in a somewhat greater reduction in the correlation coefficient. In general, the listwise correlations differ substantially from the other two, as a consequence of the clustering of missing data caused by the improper skip patterns previously discussed.

As a solution to the problem of missing data in this data set, based on the prior analysis, three things are suggested. First, missing values will be replaced with means on those variables which 1) do not appear to cluster on missing values, 2) do not show substantial income differences between present-absent cases and 3) do not have more than about five per cent of the cases missing. Second, for those variables, such as first and present occupation and years in the labour force, which have more than five per cent of cases missing, show clustering of missing values and have income differences between those with codes present and absent, means will not be used to replace missing values, but rather missing values will be replaced with estimates based on related information in the data set. These solutions will be discussed in more detail in the following sections of the chapter. Third, for those variables which are to be entered into the regression equation as sets of dummy variables (i.e., career interruptions), one of these variables will

TABLE: 4-4

Correlation Coefficients of Income with Selected Independent Variables Under Three Procedures for Handling Missing Values*

	Listwise	Pairwise (N)	Substitute Means
Correlation between Missing Values Large (i.e. >.16)			
Present Occupation	.482	.470 (1350)	.433
First Occupation	.360	.363 (1392)	.352
Years Worked	.134	.117 (1389)	.117
Correlation between Missing Values Small (i.e. .16 or less)			
Education	.367	.360 (1517)	.360
Weeks Worked Per Year	.355	.393 (1536)	.392
Hours Worked Per Week	.128	.156 (1536)	.156
Career Interruptions	.131	.188 (1449)	.184
	(1213)		(1536)

* Based on the 10 per cent sample of the Gainfully Employed.

represent the category of missing information. For a complete description of how missing values were handled for each variable see Appendix B.

Estimating Present Occupation for Those With Improper Skip Patterns

The measure of present occupational status used here (for reasons to be discussed in a later chapter) is the Pineo, Porter, McRoberts' scale (1977), which is a classification of the four-digit CCDO codes (Canadian Classification and Dictionary of Occupations) into sixteen occupational status categories. This variable, which is taken from the CMS, has many missing values, since those persons who had never worked full-time or who had experienced a major career interruption in their lives were instructed to skip past the present occupation question. This meant that, in our sample of the gainfully employed (N=30,954), 6,154 persons did not provide information on their present occupation on the CMS schedule. Of these, 4,839 did respond to occupation in the reference week on the LFS, but the remaining 1,315 reported no occupational information at all.

Is it possible to estimate a value for present occupation on the CMS from information on occupation contained in the LFS? The answer is "yes", but the problem with doing this is made difficult by the coding of occupation in the LFS. Here, occupation in the reference week was coded into both the 1961 and 1971 major groups of the Census and there is no simple way to convert either of the major group codes into the Pineo, Porter, McRoberts' scale.

The strategy employed to estimate missing values for present occupation involves a number of steps. First, using information from the 1961 and 1971 major census groups codes in the LFS, a "new" measure of

occupation is created for all those with information on both present occupation and occupation in the reference week. "New" occupation is divided into three occupational status categories--upper white collar, clerical-sales-service and craft-trades-manual (see Pineo, Porter, McRoberts, 1977:95).[5] Second, to determine how good this new three-category measure of occupational status is, present occupation was regressed on "new" occupation. The equation for males and females respectively are: $Y = 3.0486 + 2.8997 (X)$, $Y = 2.4102 + 3.5789 (X)$ where Y is present occupation and X is "new" occupation. The resulting correlation is .61 for males and .69 for females (in a 10 per cent sample of the gainfully employed). This indicates a moderate to fairly strong relationship between the two, and provides a basis for using these regression equations to estimate the missing values for present occupation. Third, a value of "new" occupation is computed for all those respondents who were improperly skipped past the question on present occupation on the CMS, using information from the 1961 and 1971 major census groups on the LFS. This value on "new" occupation is then substituted into the regression equations presented above, as a means of estimating respondents' scores for present occupation. Table 4-5 shows the frequency and percentage distribution of Pineo, Porter, McRobert scores with the substitution of estimated values for missing information.

How good is the measure of present occupation with the substitution of values estimated from the regression equation of present occupation on "new" occupation? Table 4-6 shows the correlations between education, income and present occupation, with and without estimated missing values included. It can be seen that the correlations between

TABLE: 4-5

Distribution of Present Occupation Including the Substitution of Values Into Missing Categories, Males and Females*

Occupational Categories for Present Job	Males		Females	
	Frequency	Per cent	Frequency	Per Cent
Self Employed Professional	10	.7	38	6.0
Self Employed Professionals	91	6.0	2	.3
Hi-Level Management	33	2.2	59	9.4
Semi-Professions	36	2.4	8	1.3
Technicians	30	2.0	14	2.2
Missing Replaced	29	1.9	4	.6
Middle Management	37	2.4	41	6.5
Supervisors	80	5.2	1	.2
Foremen	88	5.8	113	17.9
Missing Replaced	19	1.2	32	5.1
Skilled-Clerical-Sales	42	2.7	9	1.4
Skilled-Crafts-Trade	259	16.9	2	.3
Farmers	88	5.8	137	21.7
Missing Replaced	165	10.8	43	6.8
Semi-Skilled Crafts	168	11.0	38	6.0
Unskilled-Clerical-Sales	28	1.8	32	5.1
Semi-Skilled-Clerical-Sales	80	5.2	55	8.7
Unskilled Labourers	213	13.9	2	.3
Farm Labourers	33	2.2		
Total	1529	100.0	630	100.0

* Based on 10 per cent sample of Gainfully Employed

TABLE: 4-6

Correlations of Income and Education With Present Occupation With and Without Substitution for Missing Values, Males and Females*

	Present Occupation			
	Males		Females	
	Missing Data	Substitution for Missing Data	Missing Data	Substitution for Missing Data
Income	-.448 [a]	-.443	-.534	-.534
Education	-.504	-.476	-.487	-.482
N (Sample)	1316	1529	529	630

* Based on a 10 per cent sample of the Gainfully Employed

[a] Present Occupation is scored with a low number representing high status and a high number representing low status.

occupation and education and income are not especially affected with the use of the more complete occupation variable. In conclusion, estimating missing values on present occupation utilizing information from major census categories of occupation, then, does not seriously compromise the measure of present occupation, adds more detailed information than the mere substitution of means for missing values and allows a retention of that important subset of wage earners in our analysis that would be sacrificed through the use of listwise deletion of missing values.

Estimating Missing Values on First Occupation

First occupation also suffers from non-random missing values due to improper skip instructions. The best estimate or "best guess" of first occupation might be the respondent's present occupation, with the correlation coefficient between these two variables moderately strong at .59 and .69 for males and females respectively. Therefore missing values on first occupation are estimated by substituting the corresponding value on present occupation.[6]

Measuring Experience in the Labour Force

A major strength in the CMS data is the information available on labour force experience. Most analyses of determinants of earnings have been done employing data designed to study other areas of interest, which have not contained direct measures of labour force experience. As a result, in studying determinants of earnings, researchers have had to rely on proxies of labour force experience in their analysis. Common estimates of years in the labour force are, for example, "age" or "age minus years of completed schooling minus a constant, 6" (see Featherman

and Hauser, 1976:465). For men, these estimates of work experience appear to be reasonable proxies for increments to human capital via on-the-job training; their use for women, however, is much more problematic, given the more frequent discontinuities in their labour force experience. One solution to this problem is for investigators to study only those women most like men in their labour force experiences, such as single women, thirty years of age or older (see Edgecombe Robb,1978:351).

The CMS data do not suffer from the exclusion of questions designed to measure the labour market experiences of men and women directly. Respondents were asked, "From the beginning of your first full-time job until now, in how many years have you worked full-time for pay or profit?" Further, there are a number of questions designed to capture discontinuities in the labour force experiences of women. The addition of these questions helps make the CMS data the "best" available to study earnings inequalities between the sexes in Canada.

There are a number of labour force experience variables employed in the data analysis. The first is, of course, the number of years worked for pay or profit. As noted earlier, about ten per cent of the respondents had missing values on number of years of work for pay or profit (also called years of experience). Rather than assigning all missing cases to the mean, years of experience is estimated separately for males and females, using the equation age minus years of education minus 6 (see Featherman and Hauser, 1976). For those with no full-time work experience a value of zero is assigned to years in the labour force. This method reduced the amount of missing data substantially on this variable. For example, for males, the number of missing cases is reduced from 1401 to

250, and these few were then dropped from the analysis.

The relationship of experience to earnings is not a linear one,[7] but rather curvilinear, such that the rate of monetary returns to experience begins to diminish after a certain number of years in the labour force (Featherman and Hauser, 1976; Mincer, 1974). This decreasing rate of return to experience is measured in the analysis by the term (years in the labour force) squared.

That women have very different labour force experiences than men is clearly shown in the data. In the sample of "gainfully employed", 76.8 per cent of men report uninterrupted career lines (defined as one year or more not working after first full-time job), while this was true of only 47.4 per cent of women. Further, while 67.9 per cent of males had never experienced a period of three months or more of not working since the beginning of their first job, this was true of only 45 per cent of females. Even more striking is the fact that, while the mean number of periods of not working for three months or more for men is 1.67, the mean for women is 3.59.

An attempt is made to measure the impact of career interruption on earnings determination. Utilizing a series of questions on the year the period of unemployment began and ended (see Questions 11 to 14 in Appendix D for specific recoding instructions), a third experience variable is constructed which measures the length of time in the labour force since the last major career interruption occurred, and which separates out those who never worked full-time or never returned full-time to the labour force. Table 4-7 presents a percentage distribution of this "measure of the impact of career interruptions".

TABLE: 4-7

Percentage Distribution of Measure of Impact of Career Interruptions of Gainfully Employed by Sex

Career Interruption Categories	Males	Females
1 Never out	79.2%	48.9%
2 Out, back 10 years or more	4.5	8.4
3 Out, back 5-10 years ago	1.4	6.0
4 Out, back 2-5 years ago	1.4	6.2
5 Out, back less than 2 years ago	2.5	8.0
6 Never returned full-time	2.3	10.4
7 Never worked full-time	8.8	12.2
Missing	1153	824
N	19497	11457

Measuring Unionization

There are two major reasons for including a measure of unionization in the data analysis. First, unionized workers earn more on the average than non-unionized workers do, and women have a much lower rate of unionization in Canada than men do, so that it could be argued that one possible source of the wage disparity between the sexes is their differential rates of unionization. Second, as argued in the previous chapter, one source of the marked differences in average earnings across the economic sectors of production are the differential rates of unionization among the sectors. To date, there has been no sociological study of the determinants of earnings in Canada that includes a consideration of the effect of unionization on the earnings of males and females.

An attempt is made in this dissertation to include a measure of unionization in the model of earnings determination. Neither the LFS nor the CMS included a question on union membership and, therefore, it is necessary to develop some measure of unionization based on external sources of information. It was possible to obtain union membership figures by three-digit Standard Industrial Classification codes (SIC) compiled by the Labour Data Branch of Labour Canada. The basic data on national and international unions and their locals or branches are obtained by Statistics Canada through the operation of the Corporation and Labour Unions Returns Act,[8] and then made available to Labour Canada through a co-operative arrangement. The data used here were collected in 1974 from unions on the extent of their membership in 1973, and were aggregated into three-digit SIC codes by Labour Canada.

To arrive at the rate of unionization for each three-digit SIC,

the number of unionized workers is divided by the total number of employees per three-digit SIC according to the 1971 Census of Canada. These percentage values were then grouped into quartiles, reflecting the degree of unionization ranging from very low, low, medium-high to very high, as Statistics Canada was unwilling to provide more detailed information , (the per cent unionized for each 3-digit SIC).

In the request to Statistics Canada to recode the three-digit SIC codes collected in the LFS into fifteen new industry codes (to be discussed in detail in Chapter five),it was also requested that each new industry code be subdivided into four categories, reflecting the proportion of three-digit SIC within that industry group having very low, low, medium-high and very high levels of unionization. It was then possible to construct a series of dummy variables representing degrees of unionization. Table 4-8 shows the resulting breakdown of industry by level of unionization for males and females.

TABLE: 4-8

Industry by Level of Unionization, Males and Females[a]

Industry	Unionization									
	Very Low		Low		High		Very High		Total N	
	m	f	m	f	m	f	m	f	m	f
Agriculture, Forestry and Fishing	82.5%	98.5%	17.5%	1.5%	0.0%	0.0%	0.0%	0.0%	1615	259
Mines, Quarries and Oil Wells	14.9	21.7	23.1	35.3	46.4	36.0	15.5	6.9	396	21
Manufacturing Very Concentrated	7.0	24.0	22.4	29.1	37.1	27.8	33.5	19.1	1044	154
Manufacturing Medium High Concentration	7.9	9.5	33.6	45.5	44.3	37.1	14.2	8.0	1529	538
Manufacturing Medium Low Concentration	6.4	10.5	39.5	64.2	15.4	8.4	38.7	16.9	1097	317
Manufacturing Low Concentration	12.5	9.8	50.9	35.2	36.0	54.7	.6	.3	1191	535
Construction	16.8	13.3	0.0	0.0	83.2	86.7	0.0	0.0	1918	96
Public Utilities	11.3	.5	1.6	1.3	42.4	68.6	44.7	29.6	1296	327
Private Utilities	17.5	22.2	53.5	29.5	19.4	42.2	9.6	6.1	893	103
Wholesale Trade	100.0	6.1	0.0	0.0	0.0	0.0	0.0	0.0	1134	290
Retail Trade	79.9	80.2	20.1	19.8	0.0	0.0	0.0	0.0	1757	1296
Finance Insurance and Real Estate	100.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	572	763
Government Regulated Services	28.7	24.5	24.9	46.1	46.4	29.4	0.0	0.0	1156	1988
Private Services	100.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	1613	1689
Public Administration	7.1	10.0	0.0	0.0	66.3	51.3	26.5	38.7	1483	489
Total N	7576	4787	3306	1902	5699	1755	2122	421		

[a]Source: 1973 CMS data

FOOTNOTES

1 Much of the information outlined here is based on an unpublished paper by Monica Boyd and Hugh McRoberts, entitled "Design of the 1973 Canadian National Mobility Study on Occupational and Educational Change in a Generation".

2 Additional information on the sample design can be found in the publication Methodology: Canadian Labour Force Survey, D.B.S. 71-504: 1966.

3 This weight is used throughout the data analysis in order to make the sample representative of the population of Canada.

4 A strict criterion of significance of .001 is used because of the large sample size.

5 This "new" measure of occupation is based on a combination of the 1961 and 1971 major census groups in the LFS as a combination of the 1961 and 1971 Census unit groups makes an aggregation of the census major groups into categories that more closely correspond to a similar aggregation of the Pineo, Porter, McRoberts categories. For example, by cross-tabulating the Pineo, Porter, McRoberts' scale and the two major groups census categories, it became apparent that the "service occupations" best belonged with the craft and trade occupations.

6 This may have the consequence of decreasing the effect of present occupation on earnings and increasing the effect of first occupation on earnings.

7 The relationship of years of experience and earnings was found to be significantly non-linear using an F test.

8 These figures underestimate the number unionized in each three-digit SIC, as CALURA did not send questionnaires to small unions.

CHAPTER 5

CLASSIFYING ECONOMIC SECTORS

Introduction

The present chapter will describe the development of a classification of industries which is designed to reflect distinctions in the sectors of production made in the segmented economy literature. This industrial classification will allow estimates to be made of the degrees of oligopoly/competition across industrial divisions, as well as a grouping of industries into three economic sectors--core, periphery and state.

The organization of the chapter is as follows. First, a number of recent attempts to operationalize the concept of economic sector are critically reviewed, and it is argued that none of these is adequate for Canada. Second, a number of indices of oligopoly/competition are compared, and the matter of the most appropriate unit of analysis for these is discussed. Third, two recent attempts to measure oligopoly/competition for the industrial divisions of the Canadian economy are presented, one of which--Marfels (1976)--is used as a basis for the industrial classification developed here. Fourth, since Marfels' measure is not sufficiently detailed to allow a division of industries into economic sectors, his industrial classification is refined further. Fifth, the classification of industries developed here is then presented and compared with earlier attempts to measure economic sector.

Recent Attempts to Operationalize Economic Sector

There have been at least four recent attempts by sociologists in the United States to operationalize the concept of economic sector (Bibb and Form, 1977; Beck, Horan and Tolbert, 1978; Tolbert, Horan and Beck, 1980; Hodson, 1979). The earliest of these, by Bibb and Form, grouped major Census industries into core and periphery sectors. To allocate industries to sectors, Bibb and Form relied on verbal descriptions in the literature of the defining characteristics of the core and periphery. To the core, they assigned durable goods manufacturing, mining, construction, transportation, public utilities and government. To the periphery, they assigned services, wholesale and retail trade and finance. Selected nondurable goods manufacturing were classified in the core or the periphery on the basis of Averitt's five-factor classification of manufacturing industries (Averitt, 1968).[1] Beck, et al. also present a two-way classification of economic sectors but base it on Bluestone, et al.'s (1973)[2] analysis of the distinction between the core and periphery sectors. For Beck, et al., core industries are those which exhibit high levels of capital intensity, strong unionization, large assets, high profit margins, product diversification and market concentration, while periphery industries are labour intensive and not highly unionized, with few assets, seasonal and other variations in product supply and demand, and small firm size. Accordingly, mining, construction, some durable and nondurable manufacturing, transportation, communications, utilities, wholesale trade, finance, professional services and public administration industries are allocated to the core, while agriculture, portions of durable and nondurable manufacturing, retail trade, business

and repair, and personal and entertainment services are allocated to the periphery (p.709). There is a good deal of consensus between Bibb and Form and Beck, et al. on the allocation of industries to sectors; however there are a number of important disagreements between them. Beck, et al., for example, placed wholesale trade, finance and professional industries in the core, while Bibb and Form located these in the periphery.

In a later study, Tolbert, et al. (1980) attempted to produce an empirically-grounded classification of economic sectors. Three categories of indicators were used:

1. measures of oligopoly in an industry, such as market concentration and economic scale, including assets, receipts and number of workers;
2. measures of oligopolistic behaviour in the product market, such as levels of advertising expenditures, political contributions and profits;
3. measures of oligopolistic behaviour in the labour market, such as the size of the administrative work force, unionization, wages, fringe benefits and short- and long-run job stability (Tolbert, et al., 1980:11).

These authors aggregated three-digit Standard Industrial Classification codes (SIC) to produce a set of 55 industries. Professional and public administration industries were omitted from the analysis due to the absence of information on many of the indicators.

Arguing that dual economy theorists expect that there is a common dimension underlying this set of indicators, Tolbert, et al. factor analyzed the data. The factor solution for 17 variables produced an oblique (promax) solution with two factors, accounting for 72.0 per cent

of the variance, with the first factor dominated by the economic scale and product market variables and the second by market concentration. Since the two factors were correlated at .40 and a number of the variables were weighted on both of them, the authors concluded this was not a satisfactory solution. A second factor solution was sought using a reduced set of variables, in which redundant variables were eliminated by selecting single variables to represent clusters of highly intercorrelated ones. This solution was unidimensional, as "industries with large values on the economic concentration and scale variables exhibited characteristics associated with product and labour market power as well" (Tolbert, et al., 1980:1105). Factor scores computed from this solution yielded a measure of the level of competition/oligopoly in the various industries. The authors categorized the top half of the continuum as core and the bottom half as periphery. The public administration and professional services industries were then assigned factor weights based on their standardized median incomes and assigned to the core sector on grounds that their structure effectively insulates them from competition (p.16). Tolbert and his colleagues then attempted to demonstrate the validity of their index as both a continuous and a dichotomous variable in a simple model of individual earnings determination.

The research of Tolbert, et al. has been described at some length, as serious issue can be taken with the strategy used to build an index of competition/oligopoly. At issue is the use of both measures of the "capacity for oligopoly in an industry", on the one hand, and "measures of oligopolistic behaviour in the industrial labour market", on the other. To combine these two sets in one construct can be seen to

confound the idea of economic sectors with that of labour market segmentation (a distinction that the authors themselves make in an earlier paper; see Beck, et al., 1978:p.706). As Tolbert, et al. note, dual economy theorists argue that internal labour markets are a "direct offspring of the consolidation of monopoly capitalist power and the consequent imposition of bureaucratic control" (Edwards, 1975:21). If one is concerned to study the characteristics of labour markets (the process of earnings determination being one of these) which are viewed as consequences of the social and economic organization of production within economic sectors, however, one cannot define economic sectors using information on labour market characteristics. Specifically, it seems questionable to define an economic sector partly by the average level of wages within it and then to investigate the hypothesis that wages vary across industrial sectors (see Tolbert, et al., 1980; Beck, et al., 1978). It may be that all they have found is that higher paying industries pay higher wages. Hodson and Kaufman's (1981) recent critique makes a similar point and Tolbert, et al.'s (1982) response seems a weak reply. They argue that the inclusion of median personal annual income, job tenure, and frequency of terminations create "circularity" in the definition of labour market segmentation. They write:

> It is somewhat surprising and unfortunate, then, that Tolbert, et al. contaminate their operationalization of economic segmentation with measures of key labour market outcomes. That is, included in the indicators that they use to define sectors are measures of important labour market outcomes which should be considered only as dependent variables. Their inclusion of median personal annual income, job tenure and frequency of job termination in the definition of economic segmentation renders the resulting operationization unusable for the testing of hypotheses concerning labour market outcomes (e.g., wages and job stability) (1981:882)

Hodson (1979) followed O'Connor's (1973) conceptalization of the economy as three sectors of production; two private capital sectors, the "monopoly" and the "competitive", and a third, public sector, the "state". The monopoly sector, according to Hodson, is defined by large, centralized capital and characterized by monopoly pricing, high unionization rates, technological progressiveness and high productivity. The competitive sector is defined by small, decentralized capital and characterized by wage and price competition, lack of unionization, labour intensive production and low productivity. The state sector is defined as public administration (federal, state and local), state-contracted production, plus all gas and electric utilities, and the ordnance industry. State workers, Hodson argues, are highly organized, although they often lack basic rights of unionization, such as the right to strike, which is guaranteed to private sector workers (p. 432).

Hodson classified U.S. industries into sectors using data for three-digit 1960 Standard Industry Classification titles. Information on the size of capital, economic centralization and state contracting was collected for each title. Quantitative cut-off points were then chosen for each indicator, such that "industries we know to be dominated by centralized and concentrated capital" were separated "from industries we know to be dominated by decentralized and unconcentrated capital" (1979: 443). Finally, each industry was placed in one sector or another on the basis of its overall set of ratings.

Of the 150 industrial titles Hodson used, 131 could be allocated unambiguously. The placement of the remaining 19 was less clear, so Hodson assigned them to the sector where he felt they belonged. So, for

example, financial industries, including banking, credit, insurance and real estate, were placed in the monopoly sector, and textile mills in the competitive sector. Agriculture was excluded altogether from the analysis while construction was analyzed separately from the others (p.444).

The above studies have all employed U.S. data. Canada, however, has an economy which differs in some important respects from those of the United States and other industrial countries (see the Report of the Royal Commission on Corporate Concentration in Canada, 1978:3-4), so that a classification of industries to economic sectors developed for the U.S. may not be appropriate for this country. For example, financial institutions, such as banks, clearly fall in the core sector in Canada, while this is not obviously true in the U.S. (but see Hodson).

In Canada, there has been at least one attempt to classify industries into economic sectors. Humphreys, in an Appendix to Boyd and Humphreys (1979), used aggregate statistics on market concentration of Canadian industries released by the Royal Commission on Corporate Concentration (see Marfels, 1976:80) to group industries into core or periphery sectors, and then to separate the state from the core. Based on these data, Humphreys described the core sector in Canada as composed of utilities, transportation and communication, finance, insurance and real estate, mining, public administration and the more highly concentrated manufacturing industries. She described the periphery sector as composed of trade, construction, personal, business and community services, agriculture, forestry and fishing and the less highly concentrated industries. To the state, Humphreys assigned public administration (federal, provincial and local administrations), the military, the domestic police

force, the judiciary, education and health and welfare services.

The source used by Humphreys to classify industries to sectors of production--Marfels (1976)--uses special tabulations from Statistics Canada to present measures of concentration for eight industrial divisions of the Canadian economy, along with concentration statistics for the twenty major manufacturing industrial groups. Thus, it permits the classification of industries to sectors of production on the basis of a quantitative estimate of the level of concentration in each industrial division, as well as a further classification of manufacturing industries to core and periphery sectors on the basis of product market concentration. As a source for classifying industries to sectors, however, it can be faulted on a number of counts. First, it does not differentiate public from private industries within each of the divisions. Second, within the twenty major manufacturing groups, there is great variation in the level of concentration in the minor groups, so that any classification of manufacturing major groups to sectors contains substantial errors.[3]

Humphreys' classification of industrial sectors appears basically sound, but she lacks the data adequately to assign respondents to the industries distinguished by Marfels. She attempts to assign respondents from the CMS using the Blishen-McRoberts (1975) scale, a version of the two-digit SIC codes and Canadian Classification and Dictionary of Occupations codes to locate respondents in the core or periphery sector. Boyd and Humphreys (1979) then proceed to use both this measure of economic sector and the Blishen-McRoberts measure of occupational status in a model of the income attainments of the full-time, native-born labour force.

Humphreys' attempt to assign respondents in the CMS to economic sectors, although perhaps the best she could do with the data at hand, is a very crude attempt to delineate sectors of production. She, herself, labels it an "Industrial Labour Market Classification for Canada" which, ironically, points to the confusion in her classification scheme, whereby industry and occupation have been confounded with one another. Economic sectors do have different occupational distributions (see Hodson, 1979 and Chapter 6 of this dissertation), but labour market characteristics, such as occupational distributions, are probably better seen as outcomes of the sectoral structure than as defining features of it (Beck, Horan, Tolbert, 1978:706; Hodson and Kaufman, 1981:382; Edwards, et al. 1975:4).

Recently, researchers working with the segmented economy model have been critical of the assumption of "unidimensionality" in the economic structure (see, for example, Kalleberg, Wallace and Althauser, 1981; Wallace and Kalleberg, 1981; Hodson and Kaufman, 1982). They argue that the various components of a segmented economy do not cluster together sufficiently well to be conceptualized as one factor or dimension of economic structure which can be rendered into a single dichotomy of core vs. periphery. Wallace and Kalleberg (1981), for example, examine three dichotomous measures (Beck, et al., 1978; Bibb and Form, 1977; Hodson, 1978) and Tolbert, et al.'s (1980) continuous measure of the dual economy, all of which assume that the dual economy can be represented in a single dimension. They find that each measure is only moderately correlated with the others. They then examine the relationships between each of these dual economy measures and sets of economic organization and labour market variables. They find that,while all four measures appear to tap

corporate concentration and, with the exception of Tolbert, et al.'s index, the role of the state as a purchaser of goods, they actually appear to tap very different aspects of the dual economy. Wallace and Kalleberg write, "the definitions of both Beck, et al. and Tolbert, et al. are heavily influenced by some of the labour market variables, especially training and work experience. Bibb-Form reflects earnings, sexual divisions in the labour market, and the impact of unions. Hodson's definition shows a positive effect of job stability and a negative impact of union" (1981:105). Also, Kalleberg, et al. (1981) find that concentration, state intervention, and establishment size all have net positive effects on income, so that the relationship between dual economy and income inequality becomes difficult to interpret when a unidimensional measure of the industrial structure is employed. Evidence is beginning to emerge, then, which suggests that economic segmentation is multidimensional, not unidimensional.

While the research of Oster (1979), Tolbert (1980) and Wallace and Kalleberg (1981) can be seen to test the assumption of dual economy theory that capitalist economies tend to bifurcate over time into core and periphery sectors, the approach which they adopt, i.e., a factor analysis of a set of indicators designed to capture the distinction between these two sectors, provides, at best, only a very indirect test of this. Dual economy theory is not primarily intended as an explanation of how it is that certain variables implicated in the distinction between core and periphery tend to converge or diverge historically and coalesce in distinct clusters. Instead, dual economy theory can be better seen as an attempt to explain how it is that certain industries tend to cluster

together over time in what has been identified as the economic core, while others tend to cluster in what has been described as the periphery. If one is interested in examining the structure underlying a number of indicators which describe aspects of a set of units, then a factor analysis of the correlations between these indicators across these units can be employed. If, however, the concern is to analyze how a number of units are structured relative to one another in terms of a set of indicators, then a factor analysis of the correlations between these units across these indicators (or, perhaps, some variety of profile analysis) is more in line with what the logic of the problem requires.

Unfortunately, the data and resources required to test for the existence of the dual economy in Canada are not presently available, so that it is necessary to proceed on the basis of theoretical distinctions drawn in the literature, rather than on the strength of empirical test. If these distinctions can be shown to make a difference in terms of the processes of income attainment for men and women, then this will give us some confidence in their empirical reality and theoretical importance. If, however, they appear to make no difference, then it will be necessary to question the utility of making them in the first place. In this section, we have presented a critical review of a number of attempts to classify economic sectors. With the exception of Humphreys', these classifications were developed for use in the U.S. The one approach so far developed for Canada has been found unsatisfactory for present purposes and, consequently, it will be necessary to develop a new one.

Indices of Oligopoly/Competition

Economists in Canada have for many years studied oligopoly/

competition in the market, and their research on industrial concentration provides a benchmark to use in delineating economic sectors. A pioneering study by Rosenbluth (1957), entitled Concentration in Canadian Manufacturing Industries, utilized data from 1948. A later study, Concentration in the Manufacturing Industries of Canada, published by the Canadian Department of Consumer and Corporate Affairs in 1971, employed data from 1965, and Statistics Canada has both expanded and kept this report up to data biennially since 1972 (see, Statistics Canada, Industrial Organization and Concentration in the Manufacturing Mining and Logging Industries, 1972, 1977). Most recently, Marfels (1976), in a report prepared for the Royal Commission on Corporate Concentration, presents concentration data based on special tabulations from Statistics Canada on all aggregate industrial divisions. As well, Clement's (1975) study of The Canadian Corporate Elite presents an alternative approach to those mentioned above in assessing the degree of concentration of major industries.

Industrial concentration measures have frequently been used by economists to measure the extent to which an industry approximates competition or monopoly conditions.

> Concentration data on an industry-by-industry basis provide an indication of competitive conditions in the many separate markets within the economy of a country. Where an industry consists of a number of firms such that no single one or single small group can exert a dominant influence on pricing, then the structural basis for a reasonable competitive market mechanism exists. On the other hand, where a small group of firms, such as the largest four or the largest eight in the industry, account for a dominant share of output, then the possibility of modifications of the competitive process must be taken into account. Of course, no single structural test is conclusive in this regard. In particular instances such factors as foreign trade, the existence of substitute products from other industries and the relations among the dominant firms would have to be considered as well. Nevertheless, concentration measures do provide an extremely useful indicator of the degree of competition in the economy. (Department of Consumer and Corporate Affairs, 1971, page 2)

The concept of concentration as it has been used in the literature is associated with two measurable criteria: number and size distribution of firms, or "fewness" and "inequality". These measures represent attempts to assess the degree to which an industry is structurally competitive in its product markets.

Measures of Industrial Concentration

There are a number of measures of concentration employed by economists, all of which display similar patterns, but with varying degrees of emphasis on the importance of large firms in a firm size distribution. Basically, these are of two types: summary measures and discrete measures. Summary measures of concentration take all firms in an industry into account and, in so doing, give weight to both small and large firms. The most common measure of this sort is the H-index (Hirschman-Herfindahl index), which is the sum of squares of the market shares of output resources or some other criteria of each corporation. Other summary measures are the Rosenbluth index, the E-index and the Hovarth index (see Marfels for a discussion of each and their computing formulae, page 4).

Discrete measures of concentration emphasize the importance of the largest firms in an industry. The discrete measure considered here is the concentration ratio, defined as "the fraction of activity (output, value added, employment, profits) or of the stock of productive resources (assets) accounted for by a group of the largest firms" (Royal Commission on Corporate Concentration, 1978:32). The group sizes most often used are 4, 8, 20, 50 and 100, with the 4-firm the most common.

Problems with Concentration Ratios

There are a number of problems with concentration ratios which

tend to bias them in one direction or another. As outlined in Marfels (1976:7,8), these are: (1) The cumulation of market shares in a top firm (e.g., 4 or 8) ratio disguises the dominant firms and can lead to misinterpretations in interindustry comparisons. Consider, for example, two industries in which the top four firms account for 50 per cent of manufacturing shipments. In one, the largest firm may account for 40 per cent of the value of shipments and the three remaining for 10 per cent, while, in the second, each of the four may account for 12.5 per cent of the value of shipments. (2) The nature of non-largest firms is ignored by the concentration ratio. Thus, for example, when the largest four firms have 60 per cent of the value of shipments, there is no indication of whether there are 10 or 100 firms left to share the remainder, whereas this may be important for the competitiveness of an industry. (3) Concentration ratios published by Statistics Canada exclude foreign trade imports, and assume that Canada is a closed economy. This has the effect of significantly overstating concentration levels. (4) Published concentration ratios refer to the national market as a whole and, thus, "real" market conditions are understated for industries with separate regional or, even, local submarkets (Canada, Department of Consumer and Corporate Affairs, 1971:40).

In summary, Marfels writes:

> concentration levels are overstated to the extent that (I) unincorporated businesses are omitted (II) exports are included (sales concentration only) and (III) imports are excluded (sales concentration only). On the other hand, concentration levels are understated to the extent that (I) corporations are on an unconsolidated basis and are not combined to ownership complexes according to majority control and (II) regional concentration could not be taken into account. (1976:8)

Nevertheless, he does conclude that:

> despite the aforementioned deficiencies there can be no doubt that concentration ratios represent a highly useful device to assess market power. The case for concentration ratios gains momentum from a pragmatic point of view when merits and demerits of 'competing' summary measures of concentration are taken into account. (1976:8)

The Choice of an Index

Economists commonly employ concentration ratios in their studies of oligopoly/competition. These measures, along with the H-index, are most readily available in published statistics. Beyond this, there appears to be no index, either concentration ratio or summary measure, that stands out as superior to the others. In choosing an index, then, it is important to consider how much one's results might depend upon the particular index involved. Rosenbluth (1955), in a series of comparisons among several different concentration indices, concludes that "the use of any one of the indexes (considered here) results in substantially the same ordering of observations as any of the others. Analytically, results that rest on the ordering of observations will not greatly be affected by the index used" (p. 69).

The Dimensions of Concentration Measurements

In the preceding section, some alternative concentration measures, along with their strengths and weaknesses, have been discussed. Equally important, however, are the problems concerning what Rosenbluth (1955) has labeled the "dimensions of measurement". First, what is the appropriate business unit for the measurement of concentration? The establishment? The enterprise? Secondly, what degree of corporate control should define this unit of analysis? Unconsolidated? Consolidated?

Third, how should size be measured? By assets? By sales? By some other variable? Traditionally, economists have sought to measure industrial oligopoly in terms of the market power concentration in an industry. Also, from the perspective of sectoral economy theory, the appropriate unit of analysis is the industry, not the individual firm. As Tolbert, et al. (1979) note:

> Despite some variation in terminology, there is considerable consistency in the dual economy literature regarding the choice of industry as the appropriate unit of analysis. Bluestone and colleagues (1973) discuss the sectoral distinction in terms of industries while Averitt (1978) focuses on 'firms' which he defines in terms of the 'business organization of industries'. Shepard (1970:34) notes that 'market power is held by firms but it is exercised in markets, 'while Spilerman (1977:579n) suggests similarities in technology, organization and demand make industry the appropriate unit of analysis in the study of internal labour markets'(1979:10).

The practice in Canada and in most countries is to collect and tabulate industrial data on the basis of the "establishment". An establishment is defined as, "the smallest unit that is a separate operating entity capable of reporting all elements of basic industrial statistics" and "the main purpose of using the establishment as a statistical unit is to provide a unit small enough to permit a high degree of industrial disaggregation of data into relatively homogeneous industry classes..... while maintaining the capability of collecting all the essential elements of industrial statistics without gaps or duplication for the economy as a whole" (Standard Industrial Classification Manual, Ottawa, 1970:9). Each establishment may then be assigned to the industry of major activity for purposes of classification. An establishment is usually closely equivalent to a factory, plant or mill, store, etc.

Measures of oligopoly/competition differ from most other industrial indices in using enterprises as the tabulating unit, while preserving the establishment as the basic statistical unit from which these tabulating units are built up. "That is, the data are presented for aggregations of commonly controlled establishments and related units rather than for the basic statistical units themselves" (Statistics Canada, 1977:6). The enterprise is a company or a family of companies which, as a result of common ownership, is controlled or managed by the same interests. "The presumption is that in this manner the data can be tabulated according to meaningful decision-making entities, that is, the enterprises" (Statistics Canada, 1977:6). Most enterprises are individual companies. However, in some cases, companies in widely different industries are associated with one another through common management or control. For example, the Canadian Pacific group controls companies which include railways, steamship lines, airlines, hotels and an investment company.

The enterprise or group of commonly controlled establishments can be treated as two different types of tabulating units. As unconsolidated enterprise data,

> only the commonly controlled establishments that are coded to this industry are grouped into an enterprise. Therefore, for example, in measuring concentration in the Slaughtering and Meat Processor Industry, SIC 1011, the commonly owned establishments of Canada Packers that are coded to the Slaughtering and Meat Processing Industry are grouped into an enterprise. The other establishments of the Canada Packers enterprise that are coded to other industries are treated as separate enterprises in the industries in which they occur. Thus on this basis, Canada Packers, because it operates establishments in several different industries, is treated as a separate enterprise in each of the industries in which it operates.

As consolidated enterprise data,

> the object is to study the complete enterprise and for this purpose the value added of the enterprise is measured in each of the...industries it operates in within the universe under study and the whole of the enterprise is assigned to the...industry that accounts for the largest proportion of its value added. Therefore, on this basis following our earlier example, all the establishments of the Canada Packers enterprise within the universe under study are assigned to the Slaughtering and Meat Processing Industry since this is the industry that has the greatest proportion of the value added of the enterprise. (Statistics Canada, 1977:8)

Economists tend to agree that the most appropriate type of tabulating unit for concentration measures is the unconsolidated enterprise (see for example, Rosenbluth, 1955:84; Marfels, 1976:13,91; McVey, 1979), rather than one which would group all activities of a firm into the same industry. Our interest in separating out industrial sectors is really in the enterprise, and this is particularly true in oligopolistic industries, where production is very large in scale and markets are normally national or international in scope. It is the conglomerates that represent the size of the working capital pools, not the smaller establishments of which they are composed.

Concentration measures are intended to represent the market structure in which the worker is employed, not necessarily a characteristic of specific establishments. Thus, it is preferable to measure concentration at the level of the establishment aggregated to the enterprise as the basic tabulating unit. In fact, establishments and enterprises are in most cases one and the same thing. Only four per cent of manufacturing establishments in 1972 were multi-establishment enterprises, but the importance of these to the manufacturing section is enormous; these four per cent accounted for 54 per cent of the manufacturing value added (see Marfels, 1976, Table 13). For purposes of describing market structure,

it is preferable to employ establishments or corporations assigned to industries on an unconsolidated basis, although this necessitates double counting in some cases, as the enterprise may appear as a separate entity in more than one industry, depending upon the classification of its establishments. Consolidated enterprises would appear in only the industry of their major activity and so, are not appropriate to the study of specific detailed industrial sectors, but more to the study of corporate control (see Clement, 1975:398).

Although it has been argued that the enterprise is the better tabulating unit for measures of industrial concentration, it is worth inquiring as to the relationship between levels of enterprise and establishment concentration. In a given industry, establishment concentration is generally lower than enterprise concentration, and can only equal it if there are no multi-establishment enterprises in an industry. Beyond a difference in level then, what is the relationship between them? Rosenbluth, using similar concepts--the plant and the firm--demonstrates that the "ranking of industries by firm concentration index is very similar to the ranking by plant concentration index. The Spearman correlation coefficient for the two rankings is .947" (1955:85). More recently, Marfels (1976) examined establishment and enterprise concentration data for 1972 in manufacturing, mining and logging. He finds that the Spearman rank correlation for the rankings of the top 20 industries in each category was .87. This reduced coefficient was, perhaps, partly due to the result of a high rate of establishment top-4 ratios "withheld" for reasons of confidentiality (pp.129,130).

Measures of Business Activity

Concentration statistics are calculated on various measures of business activity. These include such activities as output, employment, fixed assets, sales and value of shipments for manufacturing industries. Each of these measures of business activity taps quite distinct aspects of corporate power and, for this reason, each yields somewhat different results. For example, sales or operating revenue are indicators which measure the degree of control exercised by a particular corporation in an industrial market. Thus, they give more weight as a measure of concentration to production-oriented companies. Assets measure corporate power in terms of the "resources" that a corporation has at its disposal and, because of this, give more weight to finance-oriented companies. Used comparatively, assets are more readily comparable across sectors than sales (Clement, 1975:398). Given the separate dimensions tapped by measures of concentration based on assets and those based on sales, some composite measure may be preferable.

Rosenbluth analyzed the relationships among a set of concentration indices based on various measures of business activity--output, assets and employment. He found that:

> in general concentration in terms of fixed assets exceeds output concentration, which in turn exceeds employment concentration, the ordering of industries by concentration level is much the same, no matter which standard of size is used, so that the results of cross-section analysis based on one measure will also be applicable to the others. (1955:92)

Ideally, in employing concentration measures to assess the level of oligopoly/competition in an industrial sector, it would be desirable to choose among the alternatives discussed for the optimum set of dimen-

sions but, as Rosenbluth notes, "the set of dimensions actually used will depend only partly on what is most appropriate and very largely on the statistics that are available. In every empirical study of concentration the investigator will have to substitute what he can for what he would like" (1955:84).

In this section of the chapter, it has been demonstrated that the several measures of concentration produce much the same ordering of industries. Furthermore, while economists agree that the most appropriate type of tabulating unit for concentration measures is the unconsolidated enterprise, concentration measures based on establishments produce similar rankings of industries. Too, while assets and sales are typically the measures of business activity used to calculate concentration statistics, other measures of business activity also produce similar orderings of industries by concentration level.

Ideally, it would be desirable to locate a source which publishes a concentration ratio based on some composite of assets and sales for enterprises assigned to all 3-digit SIC's on an unconsolidated basis as a basis for operationalizing sectoral economy theory. Apparently, however, no such data source exists. At the same time, there have been a number of recent studies by economists of the degree of oligopoly/competition in the marketplace, and these provide a basis for measuring economic sector.

Recent Studies on Industrial Concentration

(a) Measures of Concentration to Access Oligopoly/Competition for the Industrial Divisions of the Canadian Economy

In a Technical Report to the Royal Commission on Corporate Concentration, Marfels (1976) examines concentration levels and trends in

the Canadian economy for the years 1965 to 1973. In this report, he presents financial statistics for corporations for each of nine industrial divisions of the Canadian economy. Two measures of market structure--concentration ratios and a measure of inequality among firms--are provided. The measures of business activity used to construct these measures of corporate size and concentration were "assets" and "sales". These data were obtained from special tabulations from the Financial, Taxation and General Research Section of the Business Finance Division of Statistics Canada.

The reporting and tabulating unit from which both the concentration ratios and the measures of inequality were constructed is the single corporation filing a T2 tax return, aggregated to industrial division on an unconsolidated basis.[4] Thus, both measures include only the corporate segment of the Canadian economy; they exclude unincorporated businesses, such as proprietorship, partnership and self-employed persons (including self-employed professionals). Marfels argues, however, that this incompleteness in coverage of the business sector does not have a material influence on the analysis of concentration levels. He demonstrates that unincorporated businesses, although large in number, are relatively unimportant in terms of business activity (accounting for one to four per cent of all business), with the exception of Agriculture/Forestry and Fishing (51%) and, to a certain extent, Services (7.3%) (see Marfels, 1976:189). Even in these latter divisions though one can safely assume that unincorporated businesses will not be represented in the larger size classes. Marfels' concentration ratios based on corporate data can be regarded as upper bounds to the true level of concentration in each

industrial division, as unincorporated businesses are omitted in the denominator of the concentration ratio. Marfels contends that the potential bias involved is not substantial, and may very well be offset by biases in the opposite direction.

Marfels' measure of inequality in the size distribution of corporations within each industrial division is based on the Gini ratio of the number of corporations with assets and sales in four size groups: under one million(dollars per year), one to ten million, ten to 100 million and 1 billion and over. Overall, he finds that the size distribution of corporations in Canada is lopsided, with a large number of small corporations accounting for a comparatively minor fraction of assets and sales, and a few large corporations controlling the majority of assetsaand sales. The Gini ratio for all corporations in 1973 is .7582 for asset inequality and .5067 for sales inequality. As illustrated in Table 5-1, corporation size varies substantially by industrial division and, according to Marfels' suggested classification of levels of inequality (high, Gini ratio equals 0.7 and over; medium is 0.4 - 0.7; low is under 0.4), mining, manufacturing, utilities and finance can be rated high; trade can be judged intermediate and agriculture, forestry/fishing, construction and services can be rated low in terms of asset inequality in the size distribution of firms. In terms of sales inequality, mining, and utilities can be rated high; manufacturing and finance can be rated intermediate and agriculture, forestry, fishing, construction and services can be rated low.

Marfels presents concentration ratios for the 4, 8, 20, 50 and 100 largest corporations by asset size and by corporate sales within each of the industrial divisions of the Canadian economy in 1973. Again, he

TABLE: 5-1

Inequality in the Distribution of Assets and Sales as Measured by the Gini Ratio for Various Divisions of the Canadian Economy by Asset Size of Corporations, 1973

Division	Assets	Sales
Agriculture/Forestry/Fishing	.1725	.1664
Mining	.7981	.8205
Manufacturing	.7020	.6282
Construction	.3149	.1977
Utilities	.9131	.7338
Trade	.4086	.3763
Finance	.8487	.6334
Services	.3027	.1552
All Industries	.7532	.5067

Source: Marfels, 1976, pages 204, 205.

finds great variations in levels of concentration across industrial sectors (see Table 5-2). Using the following criteria:

(1) Top-4 concentration ratio (assets)

High:	25% and over
Medium:	15 to 25%
Low:	under 15%

(2) Top-100 concentration ratio (assets)

High:	50% and over
Medium:	30 to 50%
Low:	under 30%

(3) Inequality (assets, Gini ratios)

High:	0.7 and over
Medium:	0.4 to 0.7
Low:	under 0.4

he finds that utilities, finance and mining are highly concentrated; manufacturing, trade and construction are moderately concentrated; and service, agriculture, forestry and fishing are not very concentrated. This classification of industrial divisions at the extremes of the spectrum seems straightforward, but Marfels has difficulty in classifying manufacturing since, according to the inequality measure, it should be classed as highly concentrated, whereas, according to the top-4 concentration ratio, it should be classified as low. Moreover, the division based on the top-100 concentration ratio classifies it as moderately concentrated. He decides to label it moderately concentrated, a solution which, given his choice of alternatives, is perhaps the best possible. As previously mentioned, at least for the manufacturing sector, this classification is not unambiguous.

TABLE: 5-2

Shares of Assets (A) and Sales (S) Accounted for by the 4, 8 and 100 Largest Corporations in Various Divisions of the Canadian Economy Ordered by Divisional Assets, 1973

Division	Top 4		Top 8		Top 100	
	A	S	A	S	A	S
Agriculture, Forestry, Fishing	6.8	3.3	8.4	4.5	22.6	21.6
Mining	20.4	17.4	29.6	31.7	77.7	81.0
Manufacturing	8.9	6.5	14.9	16.2	47.7	39.1
Construction	5.7	1.8	9.3	3.5	31.9	16.7
Utilities	39.2	26.0	54.5	36.1	89.5	67.3
Trade	10.4	6.3	15.4	12.7	36.0	32.5
Finance[a]	33.2	23.2	45.6	32.2	69.1	51.0
Services	4.6	3.0	7.6	5.1	29.3	15.3

[a] Excluding Credit Unions (SIC 716), Caisses Populaires (SIC 717), Foreign Business Corp (SIC 765) and Insurance Carriers (SIC 771, 772, 775 and 776)

Source: Marfels (1978:49). Based on Special Tabulations, Business Finance Division, Statistics Canada, Ottawa (1976).

(b) Concentration Levels and Trends in Canadian Manufacturing Industries

Concentration statistics for manufacturing, mining and forestry industries are available on a disaggregated basis. Statistics Canada biennially publishes complete concentration data based on the Census of Manufactures for the manufacturing, mining and forestry division for both establishments and enterprises assigned to 4-digit (SIC) titles on an unconsolidated basis. These data are expressed in terms of value-of-shipment concentration ratios for the 4, 8, 12, 17, 20 and 50 largest establishments or enterprises, and there are also related ratios for various other measures of business activity (including value added, employment, etc.) and the Hirschman-Herfindahl index (H-index). The top-4 and 8 ratios are missing for a number of industries because of confidentiality rules; the H-index, as a summary measure, is unaffected by confidentiality rules and, thus, covers the complete population.

Marfels (1976) uses the 1972 data to examine concentration levels for all major manufacturing industries (n=20). He selects the top-4 value-of-shipment concentration ratio as the reference measure for both establishments and enterprises assigned to major manufacturing industries on an unconsolidated basis. He then classifies major groups of manufacturing industries into high, medium and low concentration categories, employing the following criteria:

(1) High: top-4 enterprise ratio of 60 per cent or more
(2) Medium: top-4 enterprise ratio of 30 to 59 per cent
(3) Low: top-4 enterprise ratio of less than 30 per cent

According to this classification, 33.5 per cent of manufacturing industries fell into the high concentration category, 43.9 per cent into the

medium category and 22.6 per cent into the low category (Marfels, 1976: 108). Highly concentrated industries are mainly found in the following industry groups: tobacco products, rubber industries, textile industries, primary metals, transportation equipment, petroleum and coal and miscellaneous manufacturing. Those with low concentration are found in knitting mills, clothing, printing and publishing and metal fabricating. A more complete breakdown is given in Table 5-3.

Marfels replicates the analysis employing the H-index, and notes an overall reduction of concentration levels results; 9.4 per cent of all manufacturing industries are located in the high concentration category, 35.1 per cent and 55.5 per cent in the medium and low concentration categories respectively (p. 116). Employing the H-index, Marfels finds that, while it is not difficult to detect the industry groups of low concentration, it is more difficult to determine those of high concentration and, therefore, he compiles a list of the 20 individual industries showing the highest concentration levels in terms of both the top-4 ratios and the H-index. He finds that a cross-comparison of the two lists shows an almost perfect concordance. That is, highly concentrated industries in terms of the H-index are also highly concentrated in terms of the 4-enterprise ratios, thus confirming Rosenbluth's (1955) conclusion that the use of any one of index results in substantially the same ordering of observations as the use of any other.

Marfels also analyzed the top-4 enterprise concentration ratio and the H-index for major parts of mining and forestry divisions in 1972. Three-quarters of the industries in mining had high concentration levels, with the highest concentration in metal mines, followed by non-metal mines;

TABLE: 5-3

Concentration Levels for all Manufacturing Divisions Based on Enterprises Aggregated on an Unconsolidated Basis, 1972

	Top-4-Ratio of Value of Shipments	Industries
Highly Concentrated Industries	60% and More	Tobacco Products Rubber Industries Textile Industries
		Primary Metals Transportation Equipment Petroleum and Coal
		Miscellaneous Manufacturing
Medium Concentrated Industries	30 - 59%	Food and Beverage Leather Wood
		Furniture and Fixture Paper and Allied Products Machinery
		Electrical Products Non-metallic Mineral Products Chemicals
Low Concentrated Industries	Less than 30%	Knitting Mills Clothing
		Printing and Publishing Metal Fabricating

quarries and sand pits showed low levels of concentration. Concentration data in logging were reported for two industries (SIC 0311 and 0319), both of which showed medium concentration levels according to the top-4 enterprise ratio, but low levels in terms of the H-index.

An Alternate Approach--Clement

In The Canadian Corporate Elite, Clement (1975) analyzes industrial concentration using a methodology which differs from that employed by economists. He argues that, whereas economists are concerned with competing economic units, sociologists are concerned with "similar social types and their control of competing economic units" (pp.126). As a result, he suggests that the traditional economist's focus on monopoly is too sector-specific and, since capital cuts across sectors, "what should be focused on is the overall structure of power. This assumes that the major way capitalists relate is through capital and not necessarily, as the conglomerate illustrates, through similar productive activities" (pp.126).

Clement's concern is with dominant corporations, and he begins his analysis by defining 113 dominant corporations in Canada. Based on a composite of revenue and assets, dominant corporations are defined using two points of reference: first, within particular functionally defined sectors, by the amount of revenue and of assets accounted for and, second, in the context of all other corporations outside that functionally defined sector in order to balance the importance of each sector against all others. In defining a dominant corperation, the criteria employed were: a corporation was defined as dominant if it had assets of greater

than $250 million and sales of over $50 million and as middle range if $50 million assets and $10 million sales but not meeting the criteria for dominance. These guidelines remained flexible, so that, within particular functionally defined sectors, such as banking and insurance, when the largest corporations accounted for 80 per cent or more of sales and assets within that sector, only these were selected as dominant.

The source of Clement's data on industrial concentration was the corporation but, whereas Marfels uses tabulating units based on individual legal entities as compiled from individual T2 tax returns and aggregated by SIC, Clement uses the concept of corporate complexes or families, which groups corporations under the sector of their major activity. Thus, Marfels uses unconsolidated statements, while Clement uses consolidated statements as the basic tabulating unit.

In his analysis, Clement calculates the percentage of all assets and of all revenue that can be attributed to dominant corporations within industrial sectors, but since he uses consolidated statements, the assets attributable to a particular industry may not all be directly attached to enterprises that are within that industry. His results are reproduced in Table 5-4. The findings indicate that, as with Marfels, utilities and finance and, to a lesser extent, mining can be classified as highly concentrated divisions. Clement's data, however, provide more detail than do Marfels', and indicate that, rather than classifying trade as a division of intermediate concentration, only retail trade falls into this category, while wholesale trade seems to be less concentrated. Clearly, service industries, according to Clement, also fall into the class of low concentration. Furthermore, evidence suggests that there are both high and low levels of concentration within manufacturing industries. Both Clement and Marfels find that primary metals, transportation equipment, petroleum and miscellaneous

TABLE: 5-4

Shares of Assets and Revenue Accounted for by Dominant Corporations in Various Divisions of the Canadian Economy, 1971

Sector		Per Cent Assets	Per Cent Revenue	Number Dominant
Finance	Banks	90	91	5
	Life Insurance	86	81	13
	Sales, Finance	90		8
	Mortgage & Trust	80		9
Trade	Retail	39	45	11
	Wholesale	15	11	7
Transportation & Utilities	Utilities	66	81	9
	Railways	89	87	2
	Pipelines	90	31	6
	Communications	97	93	2
Mining	Metal Mining	56	64	9
	Other Mining	0	0	0
	Mineral Fuels	48	40	10
Manufacturing	Food & Beverages	66	56	7
	Tobacco	-	-	2
	Rubber	0	0	0
	Leather	-	-	-
	Textiles	0	0	0
	Knitting Mills	-	-	-
	Clothing	-	-	-
	Wood	19	11	2
	Paper	52	57	6
	Printing & Publishing	0	0	0
	Primary Metals	55	57	4
	Metal Fabricating	-	-	3
	Machinery	66	58	2
	Transportation	59	59	3
	Electrical Products	35	31	2
	Non-metallic Mineral	44	30	3
	Petroleum & Coal	90	94	8
	Chemical Products	-	-	1
	Miscellaneous	29	43	2
Construction		0	0	0
Services		0	0	0
Storage		0	0	0
Real Estate		0	0	0

- No information
Source: Clement (1973:129-150, 400-428)

manufacturing display high levels of concentration. Other manufacturing industries that Clement lists as having dominant corporations are paper products, food and beverages, non-metallic minerals, machinery and electrical products. These industries Marfels classifies as intermediate in concentration level. Of course, Marfels' and Clement's analyses are not directly comparable, although one would expect similar findings, as Clement's dominant corporations will often be included in Marfels' firm concentration ratios.

One weakness in Clement's approach is that it cannot yield adequate comparisons of concentration level across industrial sectors, since the number of dominant corporations within each sector varies from a low of two to a high of eleven. Thus, his results are not directly comparable to Marfels', which are based on a 4-firm ratio for each industrial sector. Clement's calculated proportion of assets and revenue accounted for by dominant firms is necessarily higher than Marfels' 4-firm ratios for two reasons: first, in most cases, the number of dominant firms exceeds four and, second, the data are aggregated on a consolidated basis. Finally, Clement's approach is less useful to this research than to his analysis of corporate power in, say, financial markets. Labour markets are not necessarily influenced by ownership separately from the size of the firm.

Developing a Measure of Economic Sector

In studying the effects of sectors on earnings determination, it would be desirable to have a measure of the degree of oligopoly/competition for each three-digit SIC title represented in the CMS sample. For reasons of confidentiality, however, Statistics Canada will not release the three-digit SIC codes for industry of present occupation. At the same time,

they did agree to release a reclassification of the industry variable. Also, it would be desirable to have a clean method of distinguishing between the public and the private sectors of the economy, but as the data now exist, both public and private establishments are classified in the same industrial divisions. Within these limitations, an attempt will be made here to reclassify industry codes in a way that is as flexible as possible and that will allow an adequate test of the hypotheses in this dissertation.

At best, detailed concentration indexes exist for the manufacturing, mining and logging, but this is not true for other industrial divisions. Therefore, it would seem advisable to employ Marfels' and Statistics Canada's classification of industrial divisions as a basis of our coding scheme, and to use the concentration measures available for it. This classification scheme, however, is not detailed enough to provide an adequate coding of industry into the three economic sectors. In the case of a number of industrial divisions, estimates of the degree of oligopoly/competition are not problematic (for example, finance clearly can be classified in the monopoly sector) but, in a number of others, Marfels' classification groups together both public and private industries, as well as industries with both high and low levels of concentration. Clement's measures of concentration are presented in somewhat greater detail than those of Marfels, and provide some further refinements that need to be made in any new industrial coding scheme. For example, Clement argues that it does not make sense to group wholesale and retail trade, as Marfels does, since retail trade appears to be more concentrated than wholesale.

As mentioned previously, both Marfels and Clement analyze the extent of concentration at the major group level of manufacturing industries. They both show clearly that the degree of concentration varies widely within the manufacturing division, but they do not always agree on which manufacturing industries are highly concentrated and which are not. Thus, for example, while both agree that primary metals, transportation equipment, petroleum and miscellaneous manufacturing display high levels of concentration, they differ in their placement of paper products, food and beverages, non-metallic minerals, machinery and electrical products. It is not necessary, however, to rely on either of these studies for estimates of the degree of concentration across major manufacturing industries, since concentration statistics are available for four-digit SIC manufacturing, mining and logging industries. In addition, these statistics are presented for both establishments and establishments aggregated into enterprise groupings on an unconsolidated basis. These data come from the Census of Manufactures, and are not limited to the corporate sector of the economy (see Statistics Canada, 1977). Consequently, these data will be used to separate out manufacturing industries by level of concentration. The measure of business activity from which the concentration statistics have been calculated in this source is the "value of shipments". Value of shipments, as does value of sales, measures market share directly and, according to Berkowitz (1978), is a better measure to use in the manufacturing division than value of assets. Berkowitz argues that either sales or shipments data are preferable to assets as measures of market share because they increase commensurability across industrial sectors.

A Revised Industry Code for Manufacturing Industries

In order to arrive at a reclassification of manufacturing industries according to the level of industrial concentration, there are several questions that must be addressed. These are listed below:

1. Which concentration measure should be used and why?
2. Based on this concentration measure, how should the three-digit manufacturing SIC codes be collapsed so as to:
   a) maintain sufficient numbers of males and females in each category?
   b) allow a recoding into a two sector model?
   c) allow an estimate of the degree of concentration in each industry?

In order to answer these questions, published data from Statistics Canada (1971, 1977) are analyzed for each four-digit SIC code aggregated on an unconsolidated basis: the number of establishments, the number of enterprises, the number of employees, the percentages of males and females in each three-digit industry, the 4, 8, 12, 20, 50 firm concentration ratios and the Herfindahl index.

Question 1: Which concentration measure should be used and why?

In order to answer this question, a correlation matrix for the 4, 8, 12, 20, 50 firm shipments ratios and the Herfindahl index was produced for both the four-digit industries (n=171) and the four-digit industries weighted by the number of employees in each.[5] As Table 5-5 indicates, the intercorrelations of the firm concentration ratios were all exceptionally high, in the range of .90 to .99, with most greater than .95. This was true of both the weighted and unweighted matrices. The Herfindahl index correlates less well with the concentration ratios, ranging from a high of .95 with the 4-firm ratio to a low of .68 with the 50-firm ratio. In

TABLE: 5-5

Correlation Matrix of the Various Measures of Concentration For the Manufacturing Division *

	FIRM 4	FIRM 8	FIRM 12	FIRM 16	FIRM 20	FIRM 50	HERFIND	NFIRM 8
FIRM 4	1.0000	.9751	.9383	.9075	.8765	.7449	.9434	.8409
FIRM 8	.9812	1.0000	.9876	.9719	.9512	.8468	.8872	.8510
FIRM 12	.9530	.9915	1.0000	.9949	.9822	.9019	.8283	.8495
FIRM 16	.9304	.9800	.9962	1.0000	.9941	.9344	.7868	.8269
FIRM 20	.9097	.9652	.9873	.9966	1.0000	.9564	.7422	.8131
FIRM 50	.8187	.8923	.9328	.9569	.9720	1.0000	.5774	.7160
HERFIND	.9536	.9031	.8477	.8269	.7963	.6814	1.0000	.7330
NFIRM 8**	.9208	.9532	.9417	.9263	.9172	.8423	.8315	1.0000

* Unweighted zero order correlations to the right of the diagonal and weighted correlations to the left of the diagonal. For each four-digit industry, the 8-firm ratio was weighted by the corresponding share of shipments. These were summed over the three-digit SIC industry.

** NFIRM 8 is the estimated three-digit, 8 firm ratios.

general, though, any one measure can be regarded as a reasonable proxy for any other.

The number of missing cases for each firm ratio varies. The Herfindahl index has four missing cases (from a possible total of 171), whereas the 4-firm ratio has 14, and the 8-firm ratio has 10. The others have even more missing data. Missing data occurred where necessary groupings were suppressed to protect the confidentiality of individual establishments (Statistics Canada, 1977:18) or where fewer enterprises accounted for 100 per cent of the shipments. For example, if three enterprises shared 100 per cent of the value-of-shipments for a specific manufacturing industry, no 4-firm ratio (or 8 or 12 firm, etc.) was listed.

After evaluating the data, the 8-firm concentration ratio was selected as the measure on which to base the new recoding of manufacturing industries. This decision was made for the following reasons. First and foremost, the 8-firm ratio may meet better with Statistics Canada's concern about violating confidentiality. Second, it captures the degree of concentration in the market structure, correlating at about .98 with the 4-firm ratio--the concentration measure most frequently used. The 8-firm ratio minimizes the problem of missing data and, since these missing cases were in highly concentrated industries, we assume that fewer than eight firms accounted for 100 per cent of the shipments. Accordingly, the value of 99.9 is assigned for the concentration ratio in missing cases.

Industry of present occupation is coded at the three-digit SIC level on the Labour Force Survey, whereas industrial concentration data for manufacturing industries is reported for each four-digit SIC.

As a result, for one three-digit code on the Labour Force Survey there may be several four-digit 8-firm concentration ratios. For example, the two corresponding four-digit SIC codes for the three-digit SIC code 108 are 1082 and 1083. Thus, in order to estimate an 8-firm concentration ratio for the three-digit SIC, a weighted average of the corresponding four-digit 8-firm concentration ratios is calculated. That is, for each four-digit SIC, the 8-firm ratio was weighted by the corresponding share of shipments. These were summed over the three-digit SIC codes. These estimated values correlated at .92 and .95 with the 4-firm and 8-firm four-digit concentration ratios (see Table 5-5).

As mentioned previously, to meet Statistics Canada confidentiality requirements, it is necessary to collapse the three-digit SIC codes.

How should the three-digit SIC codes be collapsed so as to:

a) maintain a sufficient number of both males and females in each category?

b) allow a recoding of manufacturing industries into a two sector model?

c) allow an estimate of the degree of concentration in each category?

In order to answer this question, the number and percent of males, females and total respondents in each SIC code in the CMS were estimated. Working with these numbers, an attempt is made to collapse concentration categories such that approximately equal percentages of males and females fall into each category. Groupings of three, four and five were considered, and the data appeared to fall naturally into four categories which fulfilled the above three requirements (see Table 5-6),

low	0 - 39.9%
	40 - 59.9%
	60 - 79.9%
high	80 - 100.%

TABLE: 5-6

Percentage Distribution of Manufacturing Industries in Percentage Categories of Three-Digit, 8 Firm Concentration Ratios

Three-digit 8-Firm Concentration Ratio	Manufacturing Industries	Males	Females	Total
0 - 39.9	18.7%	24.9%	35.2%	27.4%
40 - 59.9	16.1	21.5	21.7	21.6
60 - 79.9	42.7	31.7	31.9	31.7
80 - 100	20.5	21.9	11.2	19.3
CMS Sample N	171	4792	1521	6433

From this distribution, it can be seen that females are under-represented in the manufacturing industries of high concentration and over-represented in the manufacturing industries of low concentration.

The State Sector

Two distinct, but related, categories within the state sector can be distinguished: public administration and government services vs. government enterprises. In constructing the new industry classification, an attempt will be made to distinguish between these categories. In the Standard Industrial Classification scheme used and developed by Statistics Canada, each establishment is classified according to its principal activity. Thus, a government owned and operated establishment engaged in an activity assigned to a particular industry is classified in that industry. For example, a government owned railroad, electric generating station or retail liquor store is classed along with other railroads, generating stations or retail stores. In order to study income determinants within the state sector, therefore, it is necessary to separate out, as far as possible, the private and the public sectors within the three-digit SIC codes.

To begin with, in the SIC system, those establishments primarily engaged in activities of a strictly governmental nature, such as the enactment of legislation, the administration of justice, the collection of revenues and defense are classified in the major division "public administration", and this division is included in the first category of the state sector. Government services, such as educational institutions, hospitals and libraries, are all assigned to separate SIC codes. There is some confounding of public and private sectors in these codes, however,

as there are a small number of private hospitals and private schools, for example, that are also assigned the same SIC codes. Unfortunately, there is no solution to this problem, so that these private institutions will be included in the state sector. The second category--government enterprises--is much more problematic. In 1973, there were 630 government business enterprises, 498 of which were in the major division of transportation, communication and other utilities (Statistics Canada, 1973: 115-119). The percent of assets, sales and profits of government owned and operated enterprises vary substantially across the major groups in this division with, for example, government enterprises accounting for 75 per cent of assets in public utilities, 47 per cent in transportation and 22 per cent in communication. Statistics Canada (1973a, 1973b) publishes a list of federal and provincial government enterprises and, using this list and the information presented in Table 5-7, the industrial division transportation, communication and other utilities, is subdivided into a predominantly state sector and a predominantly private one.

There are also government owned and operated enterprises in wholesale trade (5 per cent), retail trade (6 per cent) and finances (9 per cent). Given the sample size of the CMS (n=44,000 c.) and Statistics Canada's concern with confidentiality, it has not been feasible to separate out the small public sector elements in these predominantly private industrial divisions.

The "New" Industrial Classification Scheme

Based on the arguments presented in this chapter, industry is classified into 17 categories as indicated in Table 5-8. Detailed assignments of the three-digit SIC codes to these categories of industry can be

TABLE: 5-7

Government Business Enterprises By Industry (1973)

	Number	% Assets	% Sales	% Profits
Agriculture, Forestry, Fishing	-	-	-	-
Total Mining	8	1	1	1
Metal Mining	2	x	x	x
Mineral Fuels	3	1	1	1
Other Mining	3	x	x	x
Total Manufacturing	29	..	..	1
Food	3	..	..	..
Beverages	-	-	-	-
Tobacco Products	-	-	-	-
Rubber Products	-	-	-	-
Leather Products	-	-	-	-
Textile Mills	1	x	x	x
Knitting Mills	1	-	x	x
Clothing Industries	-	-	-	-
Wood Industries	7	1	1	1
Furniture Industries	1	-	x	x
Paper and Allied Industries	1	-	x	x
Printing and Publishing	2	x	x	x
Primary Metals	4	3	5	5
Metal Fabricating	1	-	x	x
Machinery	-	-	-	-
Transport Equipment	1	x	x	x
Electrical Products	-	x	-	-
Non-metallic Mineral Products	2	x	x	x
Petroleum and Coal Products	-	-	-	-
Chemical and Chemical Products	4	..	..	4
Miscellaneous Manufacturing	1	x	x	x
Construction	-	-	-	-
Total Utilities	498	45	38	57
Transportation	47	37	30	44
Storage	-	-	-	-
Communication	22	9	17	20
Public Utilities	429	75	72	82
Wholesale Trade	10	1	3	6
Retail Trade	14	4	5	2
Finance	51	3	5	9
Services	20	..	1	x
Total All Industries	630	8	5	13

- nil or zero .. figures not available
x confidential
Source: Statistics Canada, CALURA, Part 1. Corporations, 1973:115-129.

found in Appendix C. The new industrial classification differs in a number of theoretically important ways from the industrial classification released in the Labour Force Study. First, it separates the mining, quarries and oil wells from forestry, fishing and trapping. The former has been identified as a core industry while the latter has been identified as a peripheral one, and so this is an important distinction to make. Second, it breaks down manufacturing industries by level of concentration, rather than in terms of the more common durable vs. non-durable distinction. This refinement is necessary in order to distinguish core from periphery manufacturing industries. Third, it separates out the public and the private sectors of the economy in transportation, communication and other public utilities, as well as in community and recreation and personal and other services.

An attempt has been made in designing this industrial classification scheme to give it a reasonable degree of flexibility. As can be seen in Table 5-8, it resembles the LFS industry code and preserves the major SIC divisions. In order to test a trichotomous model of earnings determination, industry can be further collapsed into three sectors, and a breakdown of economic sector by industry is given in Table 5-9. The use of ideal types such as periphery, state and core does not deny the existence of a graduation in industrial competition but, rather, reflects the theoretical distinctions outlining the discontinuities in the work situations and socioeconomic experiences of individual workers (Beck, et al., 1978; Horan, Tolbert and Beck, 1981; Tolbert, Horan and Beck, 1980). The industrial classification developed here allows for the measurement of a graduation in industrial concentration. It can be collapsed into

TABLE: 5-8

The "New" Industrial Classification Scheme

The "New" Industry Classification, SIC 1970		LFS Industry Classification, SIC 1970	
01	Agriculture, Forestry, Fishing	01	Agriculture
02	Mines, Quarries and Oil Wells	02	Forestry, Fishing, Trapping, Mines, Quarries and Oil Wells
03	Manufacturing, Very Concentrated	03	Manufacturing -- Durable
04	Manufacturing, Concentrated	04	Manufacturing -- Non-Durable
05	Manufacturing, Low Concentration	05	Construction
06	Manufacturing, Very Low Concentration	06	Transportation, Communications and Public Utilities
07	Construction	07	Wholesale Trade
08	Utilities, Predominantly State Regulated	08	Retail Trade
09	Utilities, Predominantly Private Sector	09	Finance, Insurance and Real Estate
10	Wholesale Trade	10	Community and Recreation Services
11	Retail Trade	11	Personal Services
12	Finance, Insurance and Real Estate	12	Other Services
13	Government-Regulated Services	13	Public Administration
14	Business and Other Services	14	Never Worked (Unemployed)
15	Public Administration	15	Not in the Labour Force
16	Never Worked		
17	Not in the Labour Force		

TABLE: 5-9

Sectoral Classification of Industries

CORE

Mines, Quarries and Oil Wells
Manufacturing, Very Concentrated
Manufacturing, Concentrated
Utilities, Predominantly Private Sector
Finance, Insurance and Real Estate

STATE

Government Regulated Services
Public Administration
Utilities, Predominantly State Sector

PERIPHERY

Agriculture, Forestry, Fishing
Manufacturing, Low Concentration
Manufacturing, Very Low Concentration
Construction
Wholesale Trade
Retail Trade
Business and Other Services

Marfels' classification of industry, for which he supplies measures of inequality in the distribution of assets and sales and a number of firm concentration ratios of assets and sales (see Tables 5-1 and 5-2).

There are, however, major limitations to this industrial classification. It would have been preferable to obtain concentration ratios for manufacturing industries at the three-digit SIC level, rather than simply grouping these industries into four categories according to level of concentration. Despite its limitations, however, it most adequately reflects the important distinctions in a segmented economy model and is, as far as we know, the only classification of industry for Canada that does so.

The sectoral classification of industries used in this dissertation is related to the distinctions used by Bibb and Form (1977), Hodson (1977; 1979), Beck, Horan and Tolbert (1978) and, especially, those employed in the more recent work of Tolbert, Horan and Beck (1980). While there are some differences in the sectoral placement of certain industries from those of the U.S. sociologists, there is consensus on the location of the majority of industries among all the studies to date. Generally, there is agreement that agriculture, forestry and fishing, wholesale and retail trade, business, personal and entertainment services are clearly periphery industries. There is general agreement, too, that mining, quarries and oil wells, communications, transportation and other public utilities, and public administration are core industries, although both Hodson and this study also differentiate between publicly- and privately-owned public utilities. There is some disagreement among studies over the sectoral placement of certain manufacturing industries.

Prior studies classify major group manufacturing industries as mixed core and periphery--the placement, of course, depending upon the criteria of differentiation. The classification of manufacturing industries by sectoral location used here is not directly comparable to those earlier studies, as it is based on a much more detailed classification of manufacturing industries.

There are a number of important differences between the Canadian and U.S. sectoral models which have to do with the way industries are concentrated in Canada as compared to the U.S.. Finance, insurance and real estate are classified in the core sector, whereas this is not consistently true in U.S. studies; and, in Canada, construction is most definitely a periphery industry, whereas, in the U.S., it is usually treated as a core industry.

In summary, this chapter has attempted to develop a classification of industry that will more adequately reflect the theoretical distinctions of the segmented economy model. The mandate for sociologists to include "structural" measures of the economy into their models of earnings determination has produced, as yet, only a few such efforts. The work done here on how best to conceptualize these structural measures is but one attempt in a rapidly developing sub-area of sociology. It is hoped that it will capture important features of the economy.

FOOTNOTES

1 Averitt (1969) presents a variety of descriptive information for a limited set of industries, primarily manufacturing.

2 Bluestone, et al., (1973) consider a variety of industries, but use wage data as the criterion measure.

3 Industry in Canada is originally coded at the three- or four-digit level of detail "minor groups". This can then be aggregated into "major groups" (n = 57) then aggregated again to divisions (n = 12) (Statistics Canada, 1970).

4 The basic source for the corporate universe in Canada is the annual publications of the "Corporation and Labour Unions Return Act" (CALURA). The concentration statistics are based upon the unstructured financial statement filed by corporations with T2 tax returns, and they comprise all active corporations operating in Canada, including foreign-owned corporations. Major exclusions are credit unions (SIC 716), caisses populaires (SIC 717), foreign business corporations (SIC 765) and insurance carriers (SIC 771, 772, 775 and 776). CALURA uses two methods of aggregating financial data on corporations. The first, as reported in Corporations Financial Statistics, employs smaller units based on individual legal entities as compiled from individual tax returns and aggregated by Standard Industrial Classification. In this case, parent companies may be classified separately from their sub-sidiaries, especially where a holding company is involved and, in some cases, this makes for double counting. The second, as reported in Industrial Corporations and Financial Institutions, employs the concept of "corporate complexes" or "families". and groups corporations under the industry of their major activity. This is analogous to the use of unconsolidated statements for the first method and consolidated state-ments for the second. Marfels' (1976) special tabulations giving measures of concentration for nine industrial divisions of the 1960 SIC code were based on the first of these methods of aggregating financial data on corporations, whereas Clement's (1975) analysis employs the second.

5 For example:

$$\text{Weight} = \frac{\text{total respondents in manufacturing, Canadian Mobility Study}}{\text{total employed in manufacturing, 1971 Census}} =$$

$$= \frac{6433}{1{,}707{,}330} = .003763$$

Estimated number of males in each SIC Canadian Mobility Study = .03768 x the number of males in each SIC, 1972

CHAPTER 6

THE TRI-SECTOR ECONOMY

Introduction

It has been argued above that differences in individual attributes, such as education, occupational status, hours worked per week, and experience, cannot completely account for the differences in earnings between the sexes. Furthermore, it has been suggested that there may be structural features of the economy which serve to promote and perpetuate the inferior economic position of women in the labour force. This study will evaluate segmented economy theory as a source of explanation for the discrepancy in earnings between the sexes.

Segmented economy theory argues that there are distinct economic sectors in capitalist economies which differ in, among other things, employment characteristics, labour market composition, the economic principles by which they operate and, partly because of these, the earnings of employees. Specifically, it is suggested that there are two major mechanisms by which earnings discrimination occurs. The first involves the differential allocation of the sexes to economic sectors, and the second concerns differential rewards to worker characteristics within each sector (see Chapter Eight). These mechanisms are said to represent key elements for understanding both earnings discrimination and the perpetuation of the inferior status of women (Beck, et al., 1980).

This chapter is divided into two sections. In the first, some differences among the sectors which might be related to differences among

them in their earnings are examined. These include such employment characteristics as level of unionization, occupational distribution, the extent of part-time work and intermittent employment, requirements for job stability and tenure, as well as labour market composition (e.g., sex, age, education, marital status, and family size. In the second section, attention is turned to the differential allocation hypothesis, which states that, relative to women, men tend to be over-represented in the core sector of the economy, which is high-wage, and under-represented in the peripheral sector, which is low-wage. To assess this argument empirically requires two basic steps. First, it must be shown that the economic sectors differ as predicted in their earnings. Second, it must be established that men and women differ as predicted in their distribution across the sectors.

Employment Characteristics of Sectors

How is it that the three sectors might be expected to differ in their average earnings? Segmented economy theory suggests that the three sectors identified here are distinguished one from another in certain economic attributes which to some extent determine their employment characteristics and labour force compositions. With the data employed here, it is not possible to address all of the important employment characteristics in terms of which industrial sectors might vary; rather, this chapter will explore only a selected number of these. Specifically, the three sectors will be compared in respect of the degree to which their constituent industries are unionized, the character of their occupational distributions, their requirements for stable and experienced

work forces, and the amount of part-time and intermittent employment. In addition, the sectors can be expected to vary in labour force composition, so they will also be compared in terms of their sex, age, educational, marital status, and family size distributions.

Before proceeding with the analysis of the data, it should be noted that an employment characteristic of an economic sector is a condition of work or employment which exists independently of the attributes of individual workers, while the labour force composition of a sector is the aggregate of the attributes which workers bring to their jobs. For example, the occupational distribution of a sector is an employment characteristic, since it is determined by the sector, i.e., individual workers with different attributes move in and out of a fixed occupational structure. At the same time, it will be necessary below to measure certain employment characteristics using aggregated data on individuals, but the risk of error in each case will be small.

Unionization

Union membership in Canada has grown only slowly over time, and only a minority of workers belong to a union. In 1973, 2,591,000 workers representing 29 per cent of the civilian labour force were unionized; in 1977, these figures stood at 3,149,000 and 31 per cent, respectively (Canada Year Book, 1978-79:Table 8.26, p.377). The measure of unionization used here is based on aggregate data, and reflects the degree to which an industry is unionized, rather than whether individual workers *per se* are union members. Table 4-8, Chapter Four, shows the percentages of males and females employed in fifteen categories of industry at different levels of unionization. These data indicate that the level of

unionization in Canada varies substantially by industry. Those industry groups with high levels of unionization include mines, quarries and oil wells, public utilities, public administration, construction and the more concentrated manufacturing industries, while those with low levels of unionization include agriculture, private utilities, trade, finance and insurance, and private service.

In segmented economy theory, union membership is hypothesized to vary systematically across sectors of the economy. Specifically, the core sector is predicted to have stronger unions and higher levels of unionization than the periphery. In Canada, the state sector is highly unionized, with five out of the 10 largest unions in the country being public service unions. According to Gunderson (1979:230), these unions, such as the Canadian Union of Public Employees, exert considerable political influence, maintain high public visibility, and compel governments to pay salaries and wages comparable to those in the core sector.

Table 6-1 shows the percentages of males and females employed in industries at different levels of unionization in each of the three economic sectors. As these data show, the state sector is the most highly unionized followed, in order, by the core and the periphery. At the same time, women are less likely than men to be employed in highly unionized industries within each sector, although the rank ordering of the three sectors in terms of level of unionization is the same for both men and women. As expected, then, the percentage of employees working in highly unionized industries is greater in the core than in the periphery: the state has the highest percentage of unionized workers; and these facts are true for workers generally, as well as for men and women workers

TABLE: 6-1

The Percent of Workers Employed by the Level of Industrial Unionization by Sectors, Males and Females

Level of Industrial Unionization	Sectors							
	Core		Periphery		State		Total	
	m	f	m	f	m	f	m	f
Very Low	22.0%	55.6%	58.3%	75.2%	14.9%	19.1%	40.5%	54.0%
Low	29.7	20.7	16.2	14.6	7.8	32.9	17.1	21.5
High	32.2	18.6	21.3	9.0	52.6	37.8	30.5	19.8
Very High	16.1	5.1	4.2	1.2	24.7	10.2	11.3	4.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Males N = 18,703 X^2 = 4512.35[1] Sig = .000

Females N = 8,865 X^2 = 2292.89 Sig = .000

separately.

Occupational Distributions

Segmented economy theory has little to say about how the distribution of occupations might be expected to vary across sectors of the economy. Instead, the concern is to identify how the sectors differ in terms of the characteristics (e.g., employment stability) of the jobs in each. At the same time, the theory does suggest that the core is distinguished from the periphery by the relatively greater development of internal labour markets. To the extent that this is true, and drawing inferences from the descriptions of the employment characteristics of the jobs in each sector, it is reasonable to predict that the core will have a greater proportion of managerial and skilled clerical, sales, and service occupations than the periphery. As well, since the state is largely comprised of government administration, health and educational industries, one might expect that it will be distinguished from the other two sectors by a relatively higher proportion of employed professional and semi-professional occupations.

Table 6-2 shows the distribution of occupations by economic sector. Several patterns can be seen here. Employed professional and semi-professional occupations are over-represented in the state, while supervisors and foremen are under-represented. When craft and trade occupations are distinguished by skill level, the more highly skilled jobs are represented about equally in each of the three sectors; semi-skilled jobs are over-represented in the core and under-represented in the state; and unskilled jobs are disproportionately represented in the core. When clerical, sales and service occupations are distinguished by level of

TABLE: 6-2

The Percent of Workers Employed in Present Occupations by Sectors, Males and Females

Present Occupation	Sectors							
	Core		Periphery		State		Total	
	m	f	m	f	m	f	m	f
Self-Employed Professional	0.2%	0.0%	1.5%	0.3%	1.0%	0.3%	1.1%	0.2%
Employed Professional	6.0	3.0	4.8	2.2	13.5	14.3	7.0	6.5
Hi-Level Management	4.0	0.7	1.7	0.1	4.4	1.2	2.8	0.6
Semi-Professions	3.0	3.2	2.4	3.4	8.3	21.9	3.9	9.7
Technicians	2.7	1.3	0.9	1.4	3.4	2.6	1.9	1.8
Middle Management	3.0	1.1	3.2	1.7	4.6	1.3	3.5	1.4
Supervisors	4.8	4.7	9.6	7.4	3.3	3.9	7.1	5.7
Foremen	7.3	0.2	7.5	0.6	4.7	0.0	6.9	0.3
Skilled-Clerical-Sales-Service	6.6	32.1	3.6	20.3	3.1	18.8	4.2	22.2
Skilled-Crafts-Trades	18.8	1.6	18.6	2.0	20.6	0.4	19.1	1.4
Farmers	0.3	0.1	8.2	0.4	0.3	0.0	4.5	0.2
Semi-Skilled-Clerical-Sales-Service	6.1	27.3	8.4	31.0	4.4	19.1	7.0	26.2
Semi-Skilled-Crafts-Trades	16.1	12.1	12.2	12.7	6.9	2.2	12.0	9.0
Unskilled-Clerical-Sales-Service	1.5	3.7	1.1	7.2	6.3	10.1	2.4	7.5
Unskilled Labour	19.1	8.8	13.5	7.9	13.9	3.9	15.0	6.7
Farm Labourers	9.4	0.1	2.8	1.5	1.2	0.0	1.9	0.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Males N = 15,941 X^2 = 2215.41 sig = .000

Females N = 6,787 X^2 = 1474.3 sig = .000

skill, the more highly skilled jobs are over-represented in the core; semi-skilled jobs are over-represented in the periphery and under-represented in the state; and unskilled jobs are over-represented in the state and under-represented in the core. Finally, farming occupations are disproportionately represented in the periphery.

In general, this pattern of occupational representation is consistent with what one might expect from segmented economy theory, although the over-representation of unskilled labouring occupations in the core, along with the over-representation of unskilled clerical, sales and service occupations in the state, stand out as apparent anomalies. Also, although the occupational distributions of men and women do differ considerably from one another, what is true here of occupations generally tends also to be true when these occupations are examined separately by sex of incumbent.

Employment Status

Industries vary considerably in terms of their requirements for full-time, year-round workers. Some industries, such as agriculture, fishing, service and retail trade, for example, have cyclical labour requirements which provide considerable opportunities for part-time and seasonal employment, while other industries, such as those which rely upon production line methods of manufacture or which have a relatively constant demand for their services or products, are less responsive to such temporal rhythms, and depend more heavily upon the availability of an experienced work force. Moreover, segmented economy theory suggests that industrial requirements for a full-time, year-round labour force vary systematically by economic sector. Specifically, the argument is that the core and the

state will tend to have higher requirements of this kind than the periphery. Industries in the core, with large firms, high capital/labour ratios, and production line technologies, it is expected, will be characterized by relatively large numbers of full-time, year-round workers. Likewise, the several levels of government which comprise the state sector rely heavily on such workers, given the constant demand for government services, along with the relatively high skill requirements for the work involved, although it is known that the state does employ many part-time and intermittent clerical workers (Canada, 1979:14-15). By contrast, industries in the periphery, where the average firm size is small, the capital/labour ratios relatively low, and the technologies comparatively primitive, it is expected, will be characterized by many part-time and intermittent workers.

Tables 6-3, 6-4 and 6-5 show that the different sectors of the economy do employ very different proportions of part-time and intermittent workers. Workers employed less than a full year are over-represented in the periphery and under-represented in the core. Also, full-time workers are over-represented in the core and under-represented in the periphery.

Experience and Stability

The theoretical distinctions drawn earlier among the core, state, and periphery sectors of the economy lead one to expect that the periphery will have lower requirements for an experienced and stable work force than will the other two sectors. In the vocabulary of segmented labour market theory, this means that the core and state sectors should be characterized by a relatively high demand for primary workers, while

TABLE: 6-3

The Percentage Distribution of Part-Year Status by Sectors, Males and Females

Number of Weeks Employed, 1972	Sectors							
	Core		Periphery		State		Total	
	m	f	m	f	m	f	m	f
1-13 weeks	3.2%	7.5%	4.4%	8.9%	3.1%	6.6%	3.8%	7.9%
14-26	4.0	7.5	6.2	11.0	3.7	7.4	5.1	9.1
27-39	6.0	7.6	8.1	9.6	4.5	7.1	6.8	8.3
40-48	6.3	7.1	9.4	9.4	5.8	13.3	7.9	10.3
49-52	80.6	70.3	72.0	61.1	82.8	65.5	76.4	64.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Males N = 16,703 X^2 = 225.35 Sig = .000

Females N = 7,235 X^2 = 97.42 Sig = .000

TABLE: 6-4

The Percentage Distribution of Part-Time Status by Sectors, Males and Females

Usual Hours Worked Per Week, 1972	Sectors							
	Core		Periphery		State		Total	
	m	f	m	f	m	f	m	f
Less than 20 hours	0.7%	3.2%	1.5%	9.6%	1.0%	5.7%	1.2%	7.1%
20-34 hours	2.2	9.4	3.5	16.5	5.4	15.5	3.6	14.9
35 hours or more	97.1	87.3	95.0	73.9	93.6	78.7	95.2	78.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Males N = 16,944 X^2 = 75.62 Sig = .000

Females N = 7,370 X^2 = 123.16 Sig = .000

TABLE: 6-5

The Percentage Distribution of Employment Status by Sectors, Males and Females

Employment Status	Sectors							
	Core		Periphery		State		Total	
	m	f	m	f	m	f	m	f
Full-time, Full-year	79.5%	63.6%	70.3%	48.9%	78.5%	56.3%	74.3%	54.2%
Part-time, Part-year	1.4	5.8	2.7	13.6	1.8	11.2	2.2	11.3
Full-time, Part-year	17.7	23.7	24.9	25.2	15.2	23.1	21.1	24.2
Part-time, Full-year	1.4	7.0	2.0	12.2	4.5	9.5	2.4	10.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Males N = 16,335 X^2 = 297.74 Sig = .000

Females N = 7,087 X^2 = 123.64 Sig = .000

the periphery sector should employ comparatively more secondary workers.

Tables 6-6 and 6-7 show the percentages of workers employed full-time for different lengths of time and absent from the labour force for different periods by economic sector and gender. As expected, there are proportionately fewer employees with extended work experience in the periphery than in either the core or the state. As expected, too, women who have experienced major career interruptions are under-represented in the core and state sectors, and over-represented in the periphery. Unexpectedly, however, long-term employment stability for men does not vary by sector.

Summing Up

From the above, a fairly clear picture of similarities and differences among the three economic sectors in their employment characteristics can be drawn. Relative to the other two sectors, the periphery is distinguished by low levels of unionization, a disproportionate number of semi-skilled clerical, sales and service occupations, a preponderance of part-time and less-than-year-round workers, and an inordinate number of workers with limited experience and (at least among female employees) major career interruptions. As for the core, it is distinguished from the other two sectors by a relatively large number of high-skill, clerical, sales and service occupations, as well as craft and trade occupations. Finally, the state is distinguished from the core and the periphery by a large number of professionals, as well as unskilled clerical, sales and service occupations.

Labour Force Compositions of Sectors

Segmented economy theory suggests that industries in the periphery

TABLE: 6-6

The Percentage Distribution of Worker Experience by Sectors, Males and Females

Number of Years Worked Full-Time for Pay or Profit	Sectors							
	Core		Periphery		State		Total	
	m	f	m	f	m	f	m	f
2 years or less	19.3%	27.4%	23.9%	34.6%	18.0%	27.5%	21.6%	31.0%
3 - 5 years	8.6	19.7	9.0	16.9	8.8	18.1	8.8	17.8
6 - 10 years	14.9	22.6	12.7	19.1	12.7	21.4	13.2	20.4
10+ years	57.2	30.4	54.3	29.4	60.6	33.1	56.3	30.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Males N = 18,703 X^2 = 93.69 Sig = .000

Females N = 8,865 X^2 = 57.65 Sig = .000

TABLE: 6-7

The Percentage Distribution of Worker Stability by Sectors, Males and Females

Work Stability	Sectors							
	Core		Periphery		State		Total	
	m	f	m	f	m	f	m	f
Never out	80.5%	61.4%	78.7%	45.8%	81.6%	54.3%	79.7%	51.3%
Out Back 10 years	5.0	7.7	3.6	7.8	4.7	9.2	4.2	8.2
Out Back 5 - 10 years	1.5	5.8	1.2	5.7	1.8	7.2	1.4	6.2
Out Back 2 - 5 years	1.3	6.0	1.3	5.7	1.6	6.4	1.4	6.0
Out Back Less than 2 years	2.3	8.2	2.7	8.2	2.2	7.9	2.5	8.1
Out returned to work part-time	2.1	4.3	2.4	11.1	1.5	6.6	2.1	8.4
Never worked full-time	7.3	6.6	10.0	15.7	6.6	8.5	8.6	11.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Males N = 17,640 X^2 = 86.42 Sig = .000

Females N = 8,269 X^2 = 260.107 Sig = .000

sector of the economy tend disproportionately to recruit their workers from among those groups whose labour market positions in terms of human capital is weakest. Historically, this would include the young, the old, women (especially the married and those with children) and the poorly educated (see Hodson, 1979; Gordon, 1972; Shepherd, 1969:141-161). As a means of assessing this, the present section will examine labour force compositions of the three sectors.[2]

Sex, Age and Education

The sex compositions of the sectors are presented in Table 6-8. These data show that women are over-represented in the state by about 9 per cent, and under-represented in the core by about 7 per cent. There does not appear, then, to be a disproportionate representation of women in the peripheral sector of the economy as the theory suggests.

Table 6-9 shows the male and female age distributions for each of the three sectors. Since these distributions differ by sex within sectors, it is necessary to describe inter-sectoral variations separately for males and females. As for the males, those under the age of 25 are under-represented in the state and over-represented in the core and the periphery, while those over the age of 65 are over-represented in the periphery and under-represented in the core and the state. Also, males between the ages of 45 and 64 are over-represented in the state. As for the females, those under the age of 30 are over-represented in the core and under-represented in the periphery, while those 35 years of age and above are over-represented in the periphery and under-represented in the core. Although these results are not generally inconsistent with what

TABLE: 6-8

The Percentage Distribution of Gender by Sectors

	Sectors			
Gender	Core	Periphery	State	Total
Males	73.9%	69.7%	58.4%	67.8%
Females	26.1	30.3	41.6	32.8
Total	100.0	100.0	100.0	100.0
				N = 27,568

TABLE: 6-9

The Percentage Distribution of Age by Sectors, Males and Females

Age	Sectors							
	Core		Periphery		State		Total	
	m	f	m	f	m	f	m	f
17-19	2.3%	6.8%	3.1%	4.7%	1.3%	2.9%	2.5%	4.5%
20-24	13.6	26.6	14.2	17.2	9.6	20.2	13.1	19.8
25-29	15.5	18.2	13.9	12.0	14.7	17.9	14.4	15.0
30-34	12.1	9.7	11.1	9.7	12.7	11.2	11.9	10.2
35-44	22.2	18.3	21.0	20.4	22.1	16.7	21.5	18.9
45-54	18.8	13.0	19.4	21.6	22.6	18.7	20.0	19.1
55-64	12.6	6.4	13.0	11.8	15.2	11.1	13.4	10.6
65+	1.6	0.6	3.7	2.2	1.6	1.0	2.8	1.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Males N = 18,703 X^2 = 217.21 Sig = .000

Females N = 8,865 X^2 = 264.94 Sig = .000

one would expect from segmented economy theory, the finding with regard to women under 30 years of age is quite inconsistent in this respect.

The distribution of educational groups across sectors is more complex than that suggested by the theory, and it differs significantly by gender. Table 6-10 shows the distribution of educational categories by sectors for males and females separately. As shown in this table, those workers with only elementary education tend to be over-represented in the periphery sector and under-represented in the state. The opposite is true of better educated workers, with those with at least some university training being over-represented in the state and under-represented in the periphery. For men, the distribution of educational groups in the core sector largely reflects the distribution of education within the total male labour force but, for women, those with both more and less education are under-represented in the core. Note that in the core sector, females who have completed secondary school are significantly over-represented (by 8.4 per cent).

What sense can we make of these findings? The relationships between education and sector for males and females can be interpreted when one considers the strong relationship between education and occupation and, also, the distribution of occupational categories within sectors. It will be recalled, for example, that the state sector has proportionally more professional and managerial occupations and, obviously, to fill these positions more highly educated manpower must be hired. The periphery and the core, on the other hand, recruit more employees into clerical sales and service,as well as craft and trade occupations, thus requiring manpower with lower educational credentials. The over-

TABLE: 6-10

The Percentage Distribution of Education by Sectors, Males and Females

Education	Sectors							
	Core		Periphery		State		Total	
	m	f	m	f	m	f	m	f
Some Elementary	12.6%	4.0%	14.9%	10.7%	9.6%	2.5%	13.2%	7.1%
Completed Elementary	14.1	9.4	15.4	13.5	10.6	6.2	14.1	10.5
Some Secondary	25.5	20.7	25.5	25.6	18.6	11.9	24.0	20.4
Completed Secondary	16.6	28.7	15.2	19.3	16.2	17.2	15.8	20.3
Some Post Secondary	7.3	9.7	6.3	7.5	7.5	7.7	6.8	8.0
Completed Post Secondary	10.2	18.2	10.4	16.2	10.4	29.7	10.4	20.9
Some University	7.8	5.8	5.8	4.3	9.0	12.0	6.9	7.0
Completed University	3.6	2.0	3.1	2.6	10.1	8.5	4.7	4.1
Post Degree	2.2	0.5	3.5	0.8	8.2	0.0	4.2	1.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Males N = 18,276 X^2 = 736.44 Sig = .000

Females N = 8,703 X^2 =1110.56 Sig = .000

representation of females with secondary school degrees in the core sector perhaps reflects the tendency for that sector to employ a disproportionate percentage of skilled clerical and sales occupations.

Marital and Family Life Statuses

Surprisingly, the literature is largely silent on the possible impacts of marital and family life statuses on sector location. Tables 6-11 and 6-12 display the distributions of marital status and family life status by sector for males and females. Table 6-11 shows that proportionately more single men are to be found employed in the periphery sector of the economy while for females the converse is true. In contrast, married women and widows tend to be over-represented in the periphery, as compared to the other two sectors. These results are consistent with the argument that those persons with the weakest labour market positions will be most likely to be employed in the peripheral sector of the economy.

Is it the case that women weaken their labour market position by bearing children? The data presented in Table 6-12 suggest that it is. Women with children are considerably over-represented in the periphery and under-represented in both the core and the state.

Summing Up

The pieces in the puzzle are coming together, and it is possible to begin to see how it might be that the sectors differ so markedly in their average levels of income (see Table 6-13). It has been demonstrated that employment characteristics of workers differ by sector, and that the very different structures of these sectors have important consequences for the labour

TABLE: 6-11

The Percentage Distribution of Marital Status by Sectors, Males and Females

Marital Status	Sectors							
	Core		Periphery		State		Total	
	m	f	m	f	m	f	m	f
Single	17.0%	31.7%	21.1%	22.7%	15.3%	30.4%	18.9%	26.7%
Married	80.0	58.4	75.4	66.8	82.0	59.4	77.9	62.9
Separated	1.2	3.9	1.5	3.1	1.4	3.0	1.4	3.2
Divorced	0.9	3.0	1.0	2.0	0.7	3.0	0.9	2.5
Widowed	0.9	3.0	0.9	5.4	0.7	4.2	0.9	4.6
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Males N = 18,371 X^2 = 88.37 Sig = .000

Females N = 8,775 X^2 =103.63 Sig = .000

TABLE: 6-12

The Percentage Distribution of Family Status by Sectors, Males and Females

Family Status	Sectors							
	Core		Periphery		State		Total	
	m	f	m	f	m	f	m	f
No children	32.5%	53.6%	34.4%	36.4%	30.3%	49.5%	33.1%	43.6%
Some children	67.5	46.4	65.6	63.6	69.7	50.5	66.9	56.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	.00.0

Males N = 18,703 X^2 = 21.73 Sig = .000

Females N = 8,865 X^2 = 197.48 Sig = .000

force compositions of each. The labour force compositions of the three sectors have been shown to differ and the implications of this for the employment of women are particularly striking. It is clear that those women who have low levels of education, little work experience, and a major career interruption in their work experience, who are married, and who have children are disproportionately in the peripheral sector of the economy.

Rather than examining the inter-relationships among these variables, the purpose here has been to present a picture of the employment characteristics of and the demographic labour force compositions of these three sectors, so that it is possible to come to understand how it might be that the sectors differ in their average earnings. In the next chapter, the independent relationships of these variables to earnings will be examined.

Earnings Differences by Sector and Sex

Segmented economy theory maintains that the average level of earnings will differ across industrial sectors of the economy, such that those in the state will not differ significantly from those in the core, while earnings in both of these will be substantially greater than those in the periphery. Reading across the "total" row of Table 6-13, it can be seen that the average earnings in the core, periphery, and state are $7,539, $6,266 and $7,677, respectively. The data, then, are entirely consistent with the theory.

Earlier, it was suggested that gender differences in earnings may vary by sector. The hypothesis that average earnings in the core will not differ from those in the state, and that earnings in both of these

TABLE: 6-13

Average Earnings by Sectors, Males and Females

	Sectors			
	Core	Periphery	State	Total[3]
Males	$ 8,584	$ 7,399	$ 9,153	$ 8,071
Females	4,537	3,484	5,548	4,368
Total	$ 7,539	$ 6,266	$ 7,677	$ 7,023

N = 23,969

will exceed those in the periphery, is expected to hold for males, but there is some suggestion that, for females, earnings in the state may exceed those in the core, and that earnings in the periphery will be lower than those in both the core and state (see Gunderson, 1979). The data in Table 6-13, however, do not lend clear support to this hypothesis. For both males and females, average earnings in the state are higher than in the core, and average earnings in the periphery are substantially lower than in either of the other two sectors. While the hypothesized pattern of earnings by sector holds for the total gainfully employed, this pattern involves an interaction between gender and sector. When sex is controlled, there is a difference in earnings for both sexes between the state and core sectors. In all three sectors, earnings from employment for males exceed those for females, with the greatest gap being in the periphery, followed closely by the core. The ratios of female to male earnings are .47, .53 and .61 for the periphery, core and state, respectively.

Distribution of the Gainfully Employed Across Sectors

The distribution of the gainfully employed across sectors by sex is presented in Table 6-14, where it can be seen that the largest share of employment is in the periphery sector (54%), followed by the state (24%) and the core (22%).[4] Employing data from the 1973 U.S. Current Population Survey, Hodson (1979:451) estimated the periphery, state and core shares of the U.S. labour force to be 49, 19 and 27 per cent, respectively, with an additional 5 per cent employed in construction. Tolbert, et al., (1980:Table 7), using data collected on the 215 industry

categories of the U.S. Bureau of the Census (1971), found that 55 per cent of the labour force were employed in the periphery. In both Canada and the U.S., then, about half of the labour force are employed in the periphery, and about a quarter in each of the state and the core.

In Chapter Three, it was pointed out that segmented economy theory posits a differential allocation of the sexes to the three economic sectors, such that males are more likely to be over-represented in the core sector and under-represented in the periphery. The theory has little to say about the allocation of the sexes to the state, but there is some evidence to suggest that females might be over-represented in the state relative to males (Hodson, 1979:Table 5).

The data in Table 6-14 show partial support for the segmented economy theory argument of the differential allocation of males and females to economic sectors, with 24 per cent of males employed in the core and only 18 per cent of females in that sector. The hypothesis is not, however, supported for the periphery sector, with 55 and 51 per cent of males and females employed there. These figures are, in fact, in the opposite direction to that hypothesized, although the differences are small. The distribution by sex for the state sector is as expected, with 32 per cent of females and 21 per cent of males employed there. This pattern is obscured in the classification used by Boyd and Humphreys (1979), who reported nearly even distributions of men and women in the core and periphery sectors, with 52 per cent of female workers in the core (defined core plus state) compared to 48 per cent of males (see Table 1). When their table is reconstructed to distinguish between core and state, the findings are similar to those reported here, with 35 per

TABLE: 6-14

The Percentage Distribution of the Gainfully Employed By Sectors, Males and Females

	Sectors		
	Core	Periphery	State
Male	23.9%	55.1%	21.0%
Female	17.8	50.6	31.6
Total	21.9	53.6	24.4

N = 27,568

TABLE: 6-15

Improvement in Earnings Under No Differential Assignment Hypothesis[a]

	Actual Mean Earnings	Revised Mean Earnings	Percent Change in Mean Earnings[b]
Male	$ 8,071.00	$ 8,111.69	0.5%
Female	4,368.15	4,247.47	-2.8%

a Population includes all those who were employed in the reference week and had incomes in 1972. Revised earnings are calculated using mean earnings for males and females in Table 6-13 and the expected N's are calculated from the number of males and females in each sector multiplied by the "total" per cent of gainfully employed in each sector (Table 6-14).

b Percent Change in Mean Earnings =

$$\frac{\text{Revised Mean Earnings - Actual Mean Earnings}}{\text{Actual Mean Earnings}} \times 100$$

cent of males and 26 per cent of females employed in the core, and 13 per cent of males and 26 per cent of females employed in the state.

There appears to be a fairly large Canada-U.S. difference in the way in which the labour force is distributed across economic sectors by sex. For example, Hodson (1979:451) finds 59 per cent of females employed in the "competitive" sector as compared to 41 per cent of males, 20 per cent of females as compared to 32 per cent (41 per cent if construction is added) of males in the "monopoly" sector, and 21 per cent of females as compared to 17 per cent of males in the state sector (calculated from Table 5, p.458, and p.451). Beck, et al. (1978), using the 1977 General Social Survey of the National Opinion Research Center, find that 61 per cent and 71 per cent of female and male workers in the U.S. are in the core (defined core plus state), and these findings are replicated in a second paper using the 1976 Current Population Survey, where Beck, et al. (1980) find that being female reduces the likelihood of being in the core by 24.5 percentage points. The disproportionate allocation of females to the peripheral sector, then, is a U.S. phenomenon, but not a Canadian one, although there is a disproportionate allocation of males to the core sector and of females to the state sector in both countries. The greater allocation of females to the peripheral sector in the U.S. may be partly accounted for by the possibly greater tendency for more part-time employment for women in the United States as compared to Canada. Both evidence and theory suggest that the largest share of part-time employment is in the periphery.

Test of the Allocation Hypothesis

It has been demonstrated that the average levels for males and

females differ across the three sectors of the economy, and that, while there is no disproportionate representation of females in the periphery, they are under-represented in the core and over-represented in the state. Segmented economy theory maintains that one mechanism that contributes to the earnings gap between the sexes is the differential allocation of the sexes to sectors. What, then, is the earnings loss to women which derives from the differential assignment of the sexes to economic sectors? It is possible to estimate this loss by computing an adjusted earnings level for each group (see Beck, et al., 1980). This adjusted earnings level is defined as the weighted average of the sector-specific mean in earnings, where the weights are numbers of workers expected under the condition of no differential assignment to sectors. To illustrate the computation of this adjusted value, consider the formula for females:

$$I_f = \exp\left[\frac{(Y_{fc})\ (N_{fc}) + (Y_{fp})\ (N_{fp}) + (Y_{fs})\ (N_{fs})}{(N_{fc} + N_{fp} + N_{fs})}\right]$$

where I_f is the adjusted income level for females and Y_{fc}, Y_{fp} and Y_{fs} are mean earnings for females in the core, periphery and state respectively, and N_{fc}, N_{fp} and N_{fs} are the numbers of females expected in each sector if there were no differential assignment of workers to sectors. By comparing these adjusted earnings to the actual mean in earnings for each sector it is possible to assess the effect of differential assignment on earnings. The data in Table 6-15 show that, under the assumption of no differential allocation to sectors by sex, males would experience a .5 per cent increase and females a 2.8 per cent decrease in their earnings.

If males and females were distributed in a similar fashion across economic sectors, without any change in the relative size of the sectors, then, there would not be a substantial change in the aggregate earnings of males and females. Thus, differential sectoral allocation does not appear to play an important part in earnings discrimination. Although it is true that females are under-represented in the high-paying core sector, this appears to be counterbalanced by their over-representation in the even more remunerative state sector. These differences balance out to yield little change in mean earnings under the assumption of no differential allocation.

FOOTNOTES

1 Chi-square (X^2) is a test of significance. It is used to test the hypothesis of relationship between two variables by a comparison of the cell frequencies which would be expected if no relationship is present to the actual values found in the table. The greater the discrepancies between the expected and actual frequencies, the larger chi-squared becomes. The significance term refers to the probability of obtaining a value of chi-squared as large or larger than the one calculated from the sample, when the variables are actually independent. A significance of .000 refers to less than 1 chance in 1,000.

2 The suggestion that the foreign born, the non-English speaking and those who are members of a non-English speaking ethnic group are disproportionately located in the periphery as compared to the core or the state sectors was also explored. Little support was found for this, except for a greater proportion of native born, English-speaking employees and employees with English-speaking ethnic origins in the state.

3 These figures were calculated utilizing CMS data on all those people reporting income from employment in 1972 and sector location. The corresponding values for all those reporting income from employment in 1972 are $7,639 and $3,096 for males and females respectively.

4 The development of the economic structure of Canada has been one of uneven growth (see, for example, Brewis, 1968; Phillips, 1978), and this is reflected in the distribution of sectors across regions in Canada. Both the Eastern and Western provinces have disproportionately more workers who are employed in peripheral industries, whereas Ontario has an over-representation of workers in core industries. The state sector is relatively evenly distributed across Canada, with slight over-representation in the Eastern provinces and under-representation in British Columbia. There is, however, an interaction between region and sex across sectors, such that, while males are under-represented in the periphery in Quebec, Ontario and the Prairie provinces, this is not true of females, and, while males are over-represented in the core in Quebec and Ontario, this is not generally true for women. Again, while the distribution of females is relatively constant across regions for the state sector, there is much greater variation in the distribution of males, with males being over-represented in Quebec and Ontario and under-represented in the Western provinces.

CHAPTER 7

THE DETERMINATION OF EARNINGS: MALE-FEMALE DIFFERENCES

Introduction

What might account for the fact that employed men earn about twice as much as employed women do? While the previous chapter identified some of the possible reasons for this, the present one attempts to incorporate these in a comprehensive and systematic model of earnings determination designed to yield precise, quantitative answers to this question. Here, it will be argued that data from all gainfully employed men and women should be used, rather than using information on a selected subset (e.g., full-time employed) of them. This model will include human capital variables, social background variables, occupational status, a unionization variable and a sectoral location variable, and will permit separate estimates to be made of the net importance of each of these factors for the earnings of men and women.

Developing a Model of Earnings Determination

Most models of earnings determination developed to date have been applied to contracted samples of men and women tailored to match the sexes in terms of certain important labour force experiences. For example, the female sample is sometimes restricted to women aged 30-44, since this age group is largely beyond child-bearing age and, therefore, potentially

eligible to take employment on the same basis as men (see Suter and Miller, 1973; Treiman and Terrell, 1975; Edgecombe Robb, 1978; Goyder, 1981). Or, for another example, sometimes both samples are restricted to only full-time workers in the labour force (see Boyd and Humphreys, 1979). Here, however, an attempt is made to compare men and women across a much broader range of labour force experiences, using more complete samples of employed males and females, on grounds that only through such comparisons will we ever be able fully to understand the similarities and differences between the sexes in the processes which determine their earnings.

There is some uncertainty over the adequacy of currently available estimates of gender earnings discrimination in Canada. The proportion of the earnings differential attributed to gender as such differs widely, depending upon the samples of men and women used, the particular explanatory factors included, and the apparent adequacy of measurement. This problem has been further compounded by the more recent call for sociologists to incorporate institutional and structural variables into the basic socioeconomic achievement model. Thus, it is necessary to formulate a "full" model[1] of earnings determination for men and women which will incorporate those factors previously shown to be important determinants of earnings, as well as a number of potentially important structural determinants, including sectoral location in the economy and the degree of industrial unionization.

Insofar as science is a cumulative enterprise, it seems useful to begin the data analysis by replicating earlier research and then to extend and elaborate upon this work as a contribution to knowledge. Two other studies on discrimination in earnings have been done

using the CMS data, although both employed contracted samples and considered only a restricted number of earnings determinants (Boyd and Humphreys, 1979; Goyder, 1981). We have chosen to start the present analysis with the model of earnings determination used by Boyd and Humphreys, for two reasons. First, the purpose of their study more closely resembles the present one; second, we take some issue with their sample selection, the technique which they used to handle missing data, and the restricted number of variables which they employed. The analysis will proceed with a version of the Boyd-Humphreys' model, using their contracted samples, but employing a rather different measure of occupational status then they did.[2] We will then argue for expanding the sample to include all employed persons. Following this, a more complete model of earnings determination appropriate to an expanded sample will be developed. This model should better represent the processes by which men and women earn their wages and salaries.[3]

The CMS data were gathered from a probability sample of the 1973 Canadian labour force, and contain information on employment and earnings for 1972. Boyd and Humphreys elected to consider that subsample of native born Canadians from the CMS who had worked full time in paid employment, i.e., 35 hours or more per week and 40 weeks or more, in 1972. This included approximately 6,000 males and 1,800 females, with the men earning on the average $9,967 in that year and the women $6,180--a difference of almost $4,000. The question which Boyd and Humphreys attempted to answer was: How is it that the women received so little income from employment (on the order of 62 per cent as much) relative to the men?

The model of earnings determination utilized by Boyd and Humphreys

included a number of variables considered in economics and sociology to be important determinants of earnings. First, the "human capital" factors of amount of education and amount of labour force experience were included in the model. As well, since it is generally understood that the rate of economic return to labour force experience tends to diminish after reaching a peak in the employment histories of individuals, this nonlinear (curvilinear) effect was represented in the model by a term calculated as years of experience squared. Both amount of education and amount of labour force experience were measured in a metric of number of years. Second, two variables typically viewed in sociology as important determinants of earnings were also included in the model: status of first occupation and status of current occupation, both measured using Blishen scores (but, in our replication, using Pineo-Porter-McRobert's scores (Pineo, Porter and McRoberts, 1978)). Finally, earnings were measured using the midpoints of the income categories employed in the Canadian Mobility Survey (see Appendix A).

Two arguments often advanced to explain male-female differentials in earnings are that these differentials derive from one or the other or some combination of: compositional differences between the sexes in their average levels of certain earnings-related variables, such as education and labour force experience, and differences between the sexes in the process of income attainment. Considering the "compositional differences" argument first, Table 7-1 shows the mean values for men and women for each of the variables considered in the Boyd-Humphreys model, and it is clear that the two sexes differ--sometimes markedly--from one another in terms of these. The men have a considerable advantage over the women in terms

of labour force experience (20.96 vs. 15.54 years), while the women enjoy at least some advantage in education, status of first occupation, and status of current occupation. The advantages, then, are not all to the men, although this does not tell us anything about how such differences might be relevant to male-female differentials in earnings, since it could be that the male advantage in labour force expereince is more than enough to counterbalance the female advantages in education and occupational status.

As for the "process of income attainment" argument, Table 7-1 also shows the results of an analysis in which employment income has been regressed on the set of human capital and occupational status variables separately for males and females. Here, one can see that men receive measurably higher returns to status of current occupation, education, and labour force experience, while women do somewhat better in the return to status of first occupation. There appears to be somewhat steeper decreases in the return to labour force experience for men than for women; even at 20 years experience, the net experience effect (years plus years squared) is in favour of men. In this case, then, the advantages are largely to the men. These results are largely in accord with Boyd-Humphrys.

The results of the Boyd-Humphreys model is relevant to full-time, native-born workers only. As shown in Chapter 6, Table 6-10, however, only 74 per cent of male employees and 54 per cent of female employees work full-time. The expanded sample used in this dissertation incorporates all employed men and women, including those who work part-time as well as full-time, those who work intermittently as well as on a regular basis, and those who have experienced major career interruptions as well

TABLE: 7-1

Restricted Model of Earnings Determination, Contracted Sample

Variables	Means and Standard Deviations		Regression Coefficients and Standard Errors	
	Males	Females	Males	Females
Income	9967.02 (4604.39)	6180.24 (2634.87)		
Status of Current Occupation[a]	9.31 (3.99)	8.89 (3.88)	-353.54 (75.83)	-234.87 (16.70)
Status of First Occupation[a]	11.16 (3.83)	9.71 (3.94)	-32.13 (16.50)	-76.28 (16.89)
Years of Education	10.91 (3.29)	11.73 (2.52)	398.81 (19.89)	306.45 (23.41)
Years in the Labour Force	20.96 (11.32)	15.54 (9.73)	344.02 (16.74)	142.49 (16.18)
Years in the Labour Force Squared	568.33 (541.87)	336.07 (413.98)	-5.85 (.35)	-2.15 (.37)
Intercept			5375.64	3922.94
		R^2	.29	.43
		N	6068	1806

a Occupational status is measured so that a low number represents high status and a high number represents low status.

as those with stable work career histories (see Chapter 4 for a more detailed description of the construction of this latter variable). Including these persons, the number of men in the CMS sample increases from 6,068 to 15,807 and the number of women from 1,806 to 6,868, with the men earning, on the average, $8,474 in 1972 and the women $4,640, a difference of over $3,800. In the expanded sample, then, the earnings gap is proportionately larger than it is in the sample of full-time native born workers. On the average, employed women earn only 55 per cent of what employed men do.

In earlier chapters, we argued for the inclusion of institutional or structural variables in the model and, following the lead of those working from the perspective of segmented economy theory, we include a measure of sectoral location in the economy in the full model (see Chapter 5 for a description of the construction of this variable). Also added is a measure of unionization, since it is argued that, if unionized workers earn more on the average than non-unionized workers, and if women have a much lower rate of unionization in Canada than men do, then one possible source of income disparity between the sexes is their different levels of unionization. The measure of unionization used here reflects the level of unionization of the industry of employment, and it is entered into the model as a set of dummy variables, with the lowest degree of unionization as the reference category (see Chapter 4 for a more detailed description of the construction of this variable).[4]

Since the expanded sample includes all employed persons, it is necessary to include a number of control variables which capture the greater incidence of part-time and intermittent employment in the sample.

These include measures of hours worked per week and weeks worked per year. These two variables are often combined into one--hours worked per year (see Goyder, 1981)--but here they are entered into the regression equation separately, the former to capture full-time vs. part-time differences in employment, and the latter to reflect the distinction between intermittent and continuous employment experiences.

In addition to the measures of experience already mentioned--years in the labour force and years in the labour force squared--a third experience variable is also introduced into the model: career interruptions. It is designed to capture the impact of career interruptions on earnings determination. Specifically, it distinguishes between those who have never been employed full-time and those who have, (among the latter) between those who have never experienced a major career interruption and those who have, and (among the latter) among people who have been back in the labour force for varying lengths of time (again see Chapter 4 for a more detailed description).

Age is another important earnings-related characteristic included in the full model. Sometimes used as a proxy for work experience, it actually measures much more than that. First, when entered into the model in a metric of years, it controls for cohort effects, i.e., differences in the age-related experiences of men and women which bear on their present earnings. Second, when entered as years squared, it takes into account the fact that the economic return to age increases up to a point and then decreases, and that the age-earnings curves for men and women may be different. In particular, the rate of decrease in the economic return to age is typically found to be greater for men than for women, and

the points at which the decrease occurs are different for the two sexes.

As noted in Chapter 2, the sociological literature on income attainment (see, for example, Featherman and Hauser, 1976; Jencks, 1972) suggests that social background characteristics play a role, either directly or indirectly, in the attainment of income. While the effect of father's occupation on income seems to work indirectly through its effect on education and occupational status, father's occupation has been shown also to have a direct effect on earnings. For this reason, a measure of father's occupational status has also been included in the model of earnings determination.

The effect of marital status on earnings is a topic of recent debate, with some researchers finding little or no effect (Goyder, 1981); others finding that marital status advantages men and disadvantages women economically (Block and Walker, 1982); and still others finding that marital status advantages men but has no effect for women (Denton and Hunter, 1982). Therefore, a measure of marital status has been included in the model. It is entered as a set of dummy variables, with "single" as the reference category.

In summary, a more complete model of earnings determination has been developed which, it is hoped, will accurately reflect the processes of earnings attainment among gainfully employed men and women. Again the question to be addressed is: How is it that women earn so little relative to men? As before, two possible sources of income inequalities will be explored: the compositional differences between the sexes in their average levels of income relevant characteristics, and the differences between them in the process by which they receive income from such

characteristics. Beginning with the compositional differences, Table 7-2 shows the mean values for men and women for each of the factors considered in the full model, and a number of potentially important male-female differences can be seen. While women have the advantage in number of years of education obtained and status of first job, men have the advantage in the majority of income-related variables. Women work fewer weeks per year and fewer hours per week on the average than men do[5], and they are generally younger and more likely to have experienced a major career interruption or to be working part-time. Proportionally more women than men are single, separated, divorced or widowed. Also, relative to men, women work in industries with low levels of unionization, and they tend disproportionately to be employed in the state sector of the economy, while males are over-represented in both the core and periphery.

Next, turning to the process of income attainment, Table 7-3 shows the results of an analysis in which earnings is regressed on the set of income-related variables in the full model separately for men and women. It can be seen that men receive almost twice as much for each unit of occupational status as women do. (Recall that high status is coded with a low value). This suggests that there is an income difference between the sexes which is attributable to differential rates of return to occupation and that, in general, it is least at lower occupational levels. This supports Agarwal and Jain's (1978) conclusion based on the work of Ostry (1968) and Gunderson (1975), that occupational groups differ in their male-to-female earnings ratios, such that, within high-level occupational categories, there are above-average earnings differentials between the sexes. The return to first occupation, however, narrowly favours women, although numerically the

TABLE: 7-2

Means and Standard Deviations of Earnings Determinants, Expanded Sample

	Males		Females	
Variables	Mean	S.D.	Mean	S.D.
Income	8474.61	5167.35	4640.35	2851.45
Status of Current Occupation	9.78	3.91	9.78	3.69
Weeks Worked	45.31	10.46	41.94	13.48
Hours Worked Per Week	39.19	13.91	36.08	8.28
Status of First Occupation	11.16	3.89	10.19	3.75
Status of Father's Occupation	10.68	3.07	10.46	3.23
Education	10.79	3.58	11.40	3.04
Years in the Labour Force	18.43	14.23	10.81	11.36
Years in the Labour Force Squared	542.01	699.20	245.94	492.00
Age	39.01	13.13	36.27	13.20
Age Squared	1699.29	1103.61	1489.67	1052.66
Career Interruptions:				
None	.81	.40	.54	.50
Returned 10 years ago	.04	.20	.09	.28
Returned 5-10 years ago	.01	.12	.07	.25
Returned 2-5 years ago	.01	.12	.07	.25
Returned 0-2 years ago	.02	.15	.08	.27
Never Returned Full-time	.02	.12	.06	.23
Never Worked Full-time	.05	.21	.06	.24
Missing	.04	.19	.04	.21
Unionization Level:				
Low	.39	.49	.51	.50
Medium	.18	.38	.22	.42
Medium High	.31	.46	.22	.42
High	.12	.32	.05	.22
Missing	.00	.03	.00	.04
Marital Status:				
Single	.18	.38	.28	.45
Married	.79	.41	.61	.49
Separated	.01	.12	.03	.18
Divorced	.01	.10	.03	.16
Widowed	.01	.09	.04	.20
Missing	.00	.05	.00	.04
Sectors:				
Core	.24	.43	.19	.39
Periphery	.53	.50	.46	.49
State	.22	.42	.35	.48
Missing	.00	.03	.00	.04
Number in Sample	15,307		6,886	

TABLE: 7-3

Models of Earnings Determinants, 1972, Males and Females

Variables	Metric Coefficients and Standard Errors			
	Males		Females	
	B	S.E.	B	S.E.
Status of Current Occupation[a]	- 302.23*	10.71	- 173.11*	9.61
Weeks Worked Per Year	99.93*	3.34	60.09*	1.99
Hours Worked Per Week	78.28*	8.20	63.52*	3.22
Status of First Occupation[a]	-49.40*	10.66	-71.22*	9.67
Status of Father's Occupation[a]	-69.70*	10.74	-40.83*	7.94
Years of Education	343.15*	11.57	178.26*	11.27
Years in Labour Force	110.93*	11.25	94.80*	8.54
Years in Labour Force Squared	-1.86*	.19	-1.43*	.17
Age	356.35*	22.47	124.28*	15.74
Age Squared	-3.80*	.25	-1.45*	.19
Career Interruptions (None) †				
Returned 10 years ago	- 599.91*	159.68	45.93	99.38
Returned 5-10 years ago	-1169.06*	265.66	-346.37*	106.93
Returned 2-5 years	-1341.99*	264.59	-398.28*	105.31
Returned 0-2 years	-1218.49*	206.88	-672.89*	96.82
Never Returned Full-time	63.83	283.34	15.72	133.99
Never Worked Full-time	-295.72	198.27	538.92*	126.54
Missing	-741.06	168.78	-399.82	123.58
Unionization Level (Low) †				
Medium	342.39*	92.63	182.01*	67.54
Medium High	998.86*	81.78	540.35*	70.16
High	964.34*	113.12	279.55*	120.88
Missing	none	none	-809.42	549.18
Marital Status (Single) †				
Married	1245.09*	96.99	13.03	63.79
Separated	1446.41*	277.51	87.91	144.69
Divorced	195.22	329.11	172.70	159.02
Widowed	1030.64*	366.55	103.64	138.97
Missing	671.55	598.41	-809.42	549.18
Sectors (Core) †				
Periphery	-535.89*	80.75	-357.29*	68.67
State	-794.38*	96.08	52.14	76.68
Missing	862.86	1239.78	-245.38	660.05
Intercept	-8006.58*	559.33	-2355.71*	390.96
R^2	.42		.50	

a Occupation is coded so that a high number (i.e. 16) represents low status and a low number represents high status (i.e. 1)

* Statistically significant from zero for the continuous variables and from the omitted category for dummy variables using F on test at the .01 level or better.

\- Signifies that when the equations are treated as a single equation with a dummy variable for gender, the gender interactive term is statistically significant from zero for the continuous variables and from the omitted category for dummy variables using an F test at the .01 level or better.

† Signifies that when the equations are treated as a single equation with a dummy variable for gender, an F test on the set of dummy variable interaction terms indicated significance.

differential returns to first occupation do not contribute substantially to the gap in income between the sexes. Background characteristics, such as father's occupational status, do appear to have an influence on earnings, although more for men than for women.

As with occupation, the returns to each year of education are over twice as great for men as they are for women, so that the absolute income gap is, in general, smallest for those with the least number of years of schooling. Goyder's (1981) findings differ from those reported here. In his analysis, the income returns to education are, in fact, greater for women than for men. He reasons that:

> since the link between occupation and income is markedly stronger among males, the principal mechanism by which education promotes higher male income is by enabling one to enter higher level occupations. Among females, the income reward as occupational status increases is more constricted and the link between education and income independent of occupational level, takes a greater relative importance (p. 331).

How can we explain the difference between these two findings? Goyder's results may be due to his use of Blishen scores for women. Since these scores are calculated using occupational prestige scores, which are based on average education and income for males, return to occupational status (net of education) for women may be deflated and that to education (net of occupational status) inflated.

Economists and sociologists point to the differential returns (in favour of men) to experience in the labour force as a source of income inequality between the sexes (see Edgecombe Robb, 1978; Featherman and Hauser, 1976; Boyd and Humphreys, 1979). The effect of experience on income is described as curvilinear, such that the monetary return to experience is measured in the regression analysis by two terms: years in

the labour force squared and years of age squared. Thus, the effect of experience on earnings is depicted as a linear combination of experience, experience squared, age and age squared.

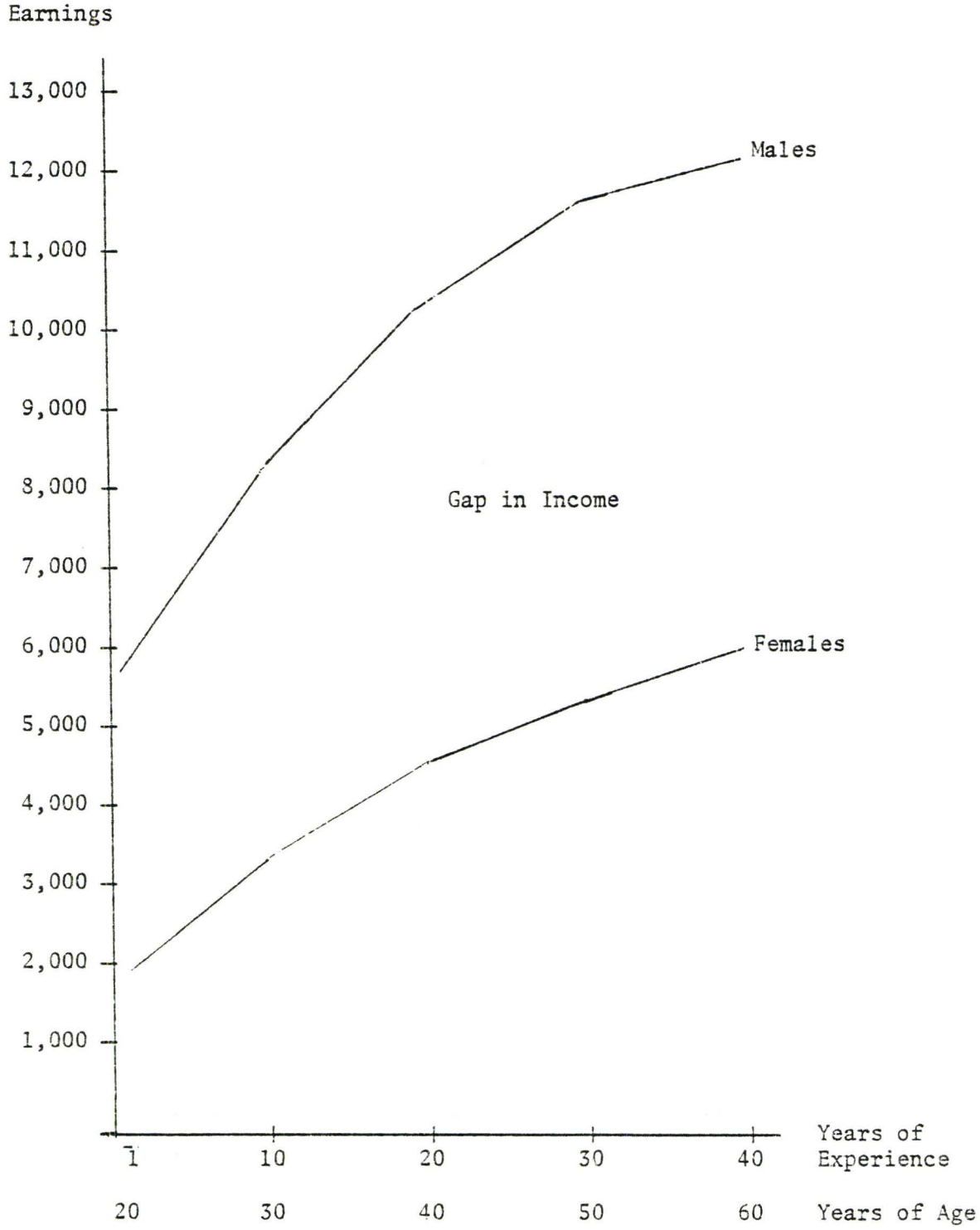
How do the differential returns to experience contribute to the income gap between the sexes? Chart 7-1 displays the calculated experience curves from the CMS data for males and females over a forty-year span,[6] assuming for this purpose that all other variables in the model equal 0. Note that the male curve rises more steeply over the first 20 years than does that for females while, at 20 years, it tends to flatten for both, but somewhat more for men than for women. The differences between men and women in the rates of return to experience, then, are greater in the first twenty years of the work career than they are thereafter.

What, then, does this tell us about how experience contributes to the income inequality between the sexes? The income gap due to the differential returns to experience is pictured on Chart 7-1 as the area between the male and female experience curves. It is smallest at one year of experience ($3,717.10), then begins to widen, reaching its peak at about thirty years of experience ($6,199.50); after thirty years, the wage gap begins to diminish such that, at forty years, there is a $6,092.20 gap.

It can be argued that, although including years of experience and years of experience squared, along with years of age and years of age squared, in the model probably captures the relationship of experience to earnings reasonably well for males, this may not be true for females. As we have demonstrated, women typically experience many more career interruptions than do men. For this reason, a measure of career interrupt-

CHART: 7-1

The Relationship of Experience to Earnings, Males and Females



ions is introduced into the model as a dummy variable, with the reference category being "never out", i.e., never having experienced a major career interruption of 7 months or more.

According to the literature reviewed in Chapter 2, one of the most important earnings determinants for women, but not for men, is time spent in paid employment. For men, this is a relative constant, with over 80 per cent of the male sample employed full-time. Table 7-3 shows that the economic return to each additional week worked, as well as to each additional hour worked per week, is higher for men than for women. As shown, women do work fewer weeks per year and fewer hours per week but, if they were to increase their labour force participation to a level equal to that of men, they would be rewarded at a rate of return which is far lower than that of the men.

The data presented in Table 7-4 address the debate mentioned previously concerning the role of marital status as a determinant of earnings. They show that married, separated, divorced, and widowed women have annual earnings which are essentially the same as those of never-married women. At the same time, married and separated (but not divorced or widowed) men earn significantly more than single men.

How does sectoral location figure as a determinant of earnings? As we saw in Chapter 3, segmentation theory is not very clear on this. One point on which the theory is clear, however, is that, as shown in Chapter 6, the three sectors do differ substantially in employment characteristics and labour market composition, as well as in earnings, and it may be that differences among them in the former are importantly responsible for the earnings differences observed among them. If this is the

case, and if these factors are controlled in an earnings model, then the effects of economic sector on earnings should be reduced, if not eliminated altogether.

Sectoral location is entered into the regression as a set of dummy variables, with core as the reference category. Thus the coefficients can be interpreted as the dollar differential to being in that sector as opposed to being in the omitted category (the core). As one can see in Table 7-3, controlling for all other factors in the model cuts the earnings disadvantage for males in the periphery (see Chapter 6) by half, and turns the earnings advantage in the state into a $794 disadvantage. For females, controlling for all other factors also reduces the earnings disadvantage in the periphery (again, see Chapter 6), and virtually eliminates the earnings advantage in the state.

The question remains: Is sectoral location, net of the compositional differences, a significant determinant of earnings? In order to answer this, we will test the hypothesis that sectoral location per se is a significant determinant of earnings, using the increment to R^2 test. The rationale here is that, if sectoral location is an important determinant of earnings, a comparison of the full model with a more restricted model (the full model minus sectoral location) will show a significant difference in R^2, using an F-test. The F-ratios are $F = 41.1$ for males and $F = 20.41$ for females, indicating that, net of all other factors in the model, sectoral location is a significant determinant of earnings for both sexes.[7]

The returns to income-related characteristics appear to vary by gender, apparently giving men a substantial income advantage over women. But are these differences in returns statistically significant? To answer this question, the null hypothesis that there are no differential

returns to determinants by gender will be tested using the F statistic to evaluate whether there is an increment to R^2 when an interactive model is compared to linear, additive model run for both sexes combined (Allison, 1977). In the linear, additive model, income is regressed on each of the determinants in the full model, plus a dichotomous gender variable, using a combined sample of males and females. In the interactive model, income is regressed on each of the determinants in the model, plus a dichotomous gender variable, and including a set of variables which are the products of gender and each of the earnings-related characteristics. This model tests for the presence of interaction, again using a combined sample of men and women. The rationale for the increment-to-R^2 test is that, if there are differential rates of return by gender, the interactive model will explain more variance than the linear, additive one.[8] Comparing the two models, the F is 33.910 (critical value of F at the .01 level is 2.04)[9], indicating that we should reject the null hypothesis of no differential returns in favour of the alternative hypothesis that gender interacts with one or more of the determinants in its effect on earnings.

Is there a differential return for males and females on <u>all</u> earnings-related variables or just on some of them? For simplicity of presentation, the results from the gender interactive model are not presented here directly, as they can be reconstructed from the findings obtained when the full model is run separately for men and women (see Table 7-3). Thus, for example, the return to education (When education is entered alone and not as a product with the female dummy variable) in the gender interactive model is the return to education for males, and equals the same value $328, as when the full model is run separately for males.

This figure, plus the return to the product of education and gender in the interactive model is the return to education for females, and equals the same value, $142, when the full model is run separately for females. Statistically significant returns to determinants obtained from the gender interactive model are underlined in Table 7-3.

The data in Table 7-3 indicate that the factors that contribute significantly to the male-female earnings differences are the earnings advantages men receive for their status of current occupation, weeks worked per year, years of education and years of age. Also, men have an earnings advantage over women if they are in industries with medium or medium-high levels of unionization (as compared to the reference category, low level of unionization), and if they are married or separated (as compared to being single). Women, however, do have earnings advantages over men if they are employed in the state (as compared to the core), and if they have experienced a career interruption within the last 10 years. Men, apparently, suffer a large earnings loss for any career interruption of 7 months or longer.

Accounting for Male-Female Earnings Differentials

Some Methodological Issues

In attempting to answer the question of how it is that women earn so little relative to men, we found that women differ from men in both their average levels of certain income related characteristics and the process by which they earn income. How, then, do these differences contribute to earnings inequalities between the sexes?

In economics and sociology, parallel but comparable applications

of regression techniques have been developed to partition group differences (see, for example, Winsborough and Dickinson, 1969; Althauser and Wigler, 1972; Blinder, 1973; Iams and Thornton, 1975). There is, however, no one correct method of decomposing differences of this kind into a set of unique components. In general, the several methods of decomposition involve: calculating a composition component by weighting the differences in composition (means) by a set of regression coefficients, and calculating a slopes or rates component by weighting the differences in coefficients by a set of means. The weights may be chosen from one or the other of the two populations, or may be combinations of the means and coefficients for both populations. These are defined more formally in the next section.

A. Procedures for Decomposition of Differences

In regression context developed earlier, let:

$\overline{Y}_m$ = the overall mean on the dependent variable--earnings for males;

$\overline{Y}_f$ = the overall mean on the dependent variable--earnings for females;

X_{im} = the mean on the i^{th} explanatory variable for males;

X_{if} = the mean on the i^{th} explanatory variable for females;

a_m = the regression constant or intercept for males;

a_f = the regression constant or intercept for females;

b_{im} = the partial regression coefficient for the i^{th} explanatory variable for males;

b_{if} = the partial regression coefficient for the i^{th} explanatory variable for females.

Decomposition of the difference $\overline{Y}_m - \overline{Y}_f$ is usually done in one of four basic ways (Iams and Thornton, 1975; Jones and Kelley, 1983). The

first (shown in equation 1 in Table 7-4) decomposes the male-female earnings difference into four components: (1) differences in the intercepts of the equations for the two groups, (2) differences in slopes, or the returns to determinants, (3) differences in the composition (or the means of the independent variable and (4) "interaction effects". Iams and Thornton (1975) allow that, "technically, it is not interaction in a statistical sense, but reflects the covariation or collinearity between the means and the coefficients of the two populations" (p. 343). The interaction component can be interpreted as the effect of changing both means and regression coefficients together over the effects of changing them one at a time (Winsborough and Dickinson, 1969). For example, one component of the sum would be the amount that women would gain if they worked as many hours per week as men and if those extra hours were paid at the same return as the men. As Jones and Kelley note, "it is a consequence of that pay differential and would disappear if there were not such differences. But it is equally a consequence of the differences in hours worked, and would disappear if men and women worked the same hours. So it is an interaction term in the sense of depending jointly on both differences, and there is no unambiguous way of allocating it to either rates-of-return or endowments" (1983:343).

This ("interaction") model weights the difference in each income-related characteristic using the female coefficient to answer the question of how much women's average earnings would increase if they had the same income-related characteristics as the men do. Further it weights the difference in each coefficient using the mean for females to answer the question of how much the women's average earnings would increase if they

TABLE: 7-4

Alternate Decomposition of the Difference in Earnings Between Males and Females

Model	Male-Female Earnings Difference	Unexplained Differences Due to Group Membership	Due to Differences in the Coefficients or Returns	Due to Differences in Composition	Due to Interaction Between Differences in Coefficients and Composition
1. "Interaction" Model	$Y_m - Y_f$	$= (a_m - a_f)$	$+\sum (b_{im} - b_{if})X_{if}$	$+\sum b_{if}(X_{im}-X_{if})+$	$\sum (b_{im}-b_{if})(X_{im}-X_{if})$
2. "Privilege" Model	$Y_m - Y_f$	$= (a_m - a_f)$	$+\sum (b_{im} - b_{if})X_{if}$	$+\sum b_{im}(X_{im}-X_{if})$	
3. "Deprivation" Model	$Y_m - Y_f$	$= (a_m - a_f)$	$+\sum (b_{im}-b_{if})X_{im}$	$+\sum b_{if}(X_{im}-X_{if})$	
4. "Combination" Model	$Y_m - Y_f$	$= (a_m - a_f)$	$+\sum \frac{(X_{im}-X_{if})}{2}(b_{im}-b_{if})$	$+\sum \frac{(b_{im}+b_{if})}{2}(X_{im}-X_{if})$	

Adapted from Jones and Kelly, 1983.

received the same returns to their earnings-related characteristics as the men do.

The second procedure, known as Blinder's "Privilege" model, takes an alternative approach (Jones and Kelly, 1983). It addresses the question: how much would men's (the privilege group) average earnings be reduced if they had the same earnings-related characteristics as the women do (i.e., the difference in income-related characteristics are weighted using the male coefficients)? This is equivalent to adding the interaction term to the composition term in the interaction model and obtaining a new, larger composition term (see equation 2 in Table 7-4).

The third procedure, labeled the "Deprivation" model (Oaxaca, 1972; Blinder, 1973), values or weights the difference in each coefficient using the mean for males on each income-related characteristic, which is equivalent to adding the interaction term to the coefficients term and, thus, augmenting that part of the earnings gap attributed to differences in returns (see equation 3, Table 7-4). This method implies that females are deprived, i.e., that they earn less than the appropriate returns to their income-related characteristics. It is a logical procedure to use if the implicit policy is to eliminate earnings discrimination by, for example, paying females the same returns as men for each hour worked.

The fourth procedure is shown in equation 4, Table 7-4, and utilizes an average of the two population weights and adds half the interaction component to the rates component and half to the composition component (Winsborough and Dickinson, 1969). Alternatively, it can be thought of as an average of the terms in the "Privilege" and "Deprivation models.

B. Comparisons Among the Four Models

The four decompositions are very closely related; their only

difference is in the treatment of the interaction term. It is worth noting that, if the interaction term is equal to zero, then all four equations are identical. If the size of the interaction component is non-trivial, then the differences among the equations can be substantial (Iams and Thornton, 1976). Failure to recognize the importance of the interaction component can result in improper utilization of the decomposition technique. For example, if a researcher were interested in three components, calculated only two of the components in equation 1, and assumed that the remaining difference was due to the component of interest not computed, he would have inadvertently added the interaction term to the uncomputed component (see, for example, Levitan, et al., 1973 and Mincer, 1960).

The choice of the model depends on the question to be addressed. Jones and Kelley write:

> The appropriate treatment of the interaction term is a matter to be decided on substantive rather than statistical grounds. If the income gap comes about because the high-earning group is privileged, earning more than the appropriate return on their endowments, or if the policy envisioned is to reduce the returns of the high-earning group to those of the low-earning group, then the interaction term can most reasonably be added to the endowments term, as in the "privilege" model. The endowments term then will reflect the extra income the high-earning group gets because of their privilege, or the drop in their income that will be produced by the policy change (cf. Duncan, 1968). But if the income gap comes about because the low-earning group is deprived, earning less than the appropriate return on their endowments, or if the policy envisioned is to increase their returns to match those of the high-earning group, then the interaction term can most reasonably be added to the "discrimination" component, as in the "deprivation" model. The endowments term then reflects the increase in the income of the low-earning group that would come about by equalizing endowments without changing anything else. There are of course intermediate solutions for which reasonable arguments can be advanced. (1983:14)

If there are no clear, substantive grounds for allocating the interaction term one way or the other, Jones and Kelley (1983) argue, it is reasonable to leave it separate, as in equation 1. This allows both the returns and composition components to be weighted by values from the same population, rather than by values from some mixture of the two populations. At the same time, it may suit some researchers' purposes to simplify the decomposition in equation 1 by distributing the interaction term equally to the rates and composition components, as in equation 4; or, more generally, as Iams and Thornton (1976) conclude, "it may be a useful strategy to utilize equation 1 in the initial decomposition and then combine the interaction component with one of the other components as appropriate" (1976:350).

In this analysis, sociologists argue that equations 1 and 3 are both suited to answering the question: how is it that employed males earn about twice as much as employed women do? It allows us to decompose the male-female difference in earnings into a composition and a coefficients or returns term, using a deprivation model which, it has been argued, is the most appropriate one for the analysis of discrimination. However, we will present the results using all four equations in Table 7-4 for those researchers who may prefer an alternate model (see Table 7-5).

One further caution is necessary. Jones and Kelley (1983) clearly demonstrate that all four models suffer from a weakness which effectively vitiates the distinction between the intercept term and the coefficients term. The problem is that the values for these two terms (but not their joint values) depend upon the (often arbitrary) choice of zero-points for the independent variables. But, while the division between them may be

TABLE: 7-5

The Male-Female Gap in Earnings Broken Down by the Four Components of Income Inequality

Model	Unexplained Differences Due to Group Membership	Due to Differences in the Coefficients or Returns	Due to Differences in Composition	Due to Interaction Between Differences in Coefficients and Composition
"Interaction" Model	$ -5,651.	$ 8,143.	$ 647.	$ 745.
"Privilege" Model	$ -5,651.	$ 8,143.	$ 1,392.	
"Deprivation" Model	$ -5,651.	$ 8,888.	$ 647.	
"Combination" Model	$ -5,651.	$ 8,515.	$ 1,020.	
"Jones-Kelly" Model	$ 2,492.		$ 647.	$ 745.

arbitrary, the joint total is not, and Jones and Kelley recommend that the income gap between groups can be sensibly decomposed into only three components: a composition term, an interaction term and a joint intercept-coefficients term. While it is true that the coefficients term is dependent on the zero points, the coefficients term itself is a product of the summation of the differences in returns to each of the determinants. Some of these determinants do have non arbitrary zero points (i.e. age, years of experience). The Jones/Kelly point is well taken in some cases, but not in others. Perhaps this suggests that further research should look at the terms separately rather than just the summation.

Decomposing the Male-Female Earnings Differential

Table 7-5 displays the total male-female earnings gap partitioned into the four components mentioned above and gives an indication of the relative importance of each of these sources of income inequality for the gap in earnings. Something of the importance of average differences between men and women in the extent to which they possess earnings-related attributes can be seen if the male means (Table 7-2) are used with the female means and female unstandardized regression coefficients (Table 7-3) in equation 1. With this device, we can see what the expected average earnings of the women would have been had they possessed the same earnings-related attributes (i.e., worked the same number of hours per week, and had the same occupations, and years of experience, etc.) as the men though still rewarded with the female reward structures. When we solve for the "expected" average income for women, we find that the mean income for women would increase by $647, to a total of $5,286. That is, if females had the same levels on income-related attributes as males, the ratio of female-to-male earnings would increase .55 to .62.

What, then, of the differences between males and females in their returns to income-related characteristics? To solve for the second com-

ponent--the expected average earnings for women if they received the same returns for each of their determinants--the unstandardized regression coefficients for the males (see Table 7-3) are used with the mean female characteristics and intercept (see Table 7-2). With this, we find that the mean income for women would increase by $8,143, to a total of $12,783. That is, if females had the same returns to each of their determinants as men did, the female-to-male earnings ratio would increase from .55 to 1.51. But, the process of income attainment differs for men and women in two other ways as well.

The third component represents the amount of the income gap attributable to women having both lower average levels of income-related factors and lower returns to these factors and, hence, it has been described as an interaction effect. The amount of the gap in male-female earnings attributable to this component is $745. If this were further added to the difference in coefficients, this will bring the expected female average income up to $13,528, or 1.60 of male income.

Finally, this leaves the fourth component--the unexplained difference or difference of y-intercepts--to be added to expected female income. The difference in male-female intercepts is $5,651 (see Table 7-2) which reduces the expected female average income to $7,877, or .93 of male income. Thus, if women gained income by the same process as men do, their earnings would increase to about 93 per cent of male earnings. The remainder of the gap is, of course, due to the differences in the sexes in their average levels of income-related characteristics.

These findings indicate that women who are gainfully employed receive so little compared to men partly because they differ in the average levels of their income-related characteristics, i.e., their compositional

differences, and partly because they differ in the process by which they earn income. Of the two factors, however, the second is by far the more important source of income inequality between the sexes, and this is true no matter which sort of decomposition is calculated.[10]

FOOTNOTES

1 The term "full model" does not mean'"complete' model", but rather one which contains a number of additional variables (see Namboodiri, Carter and Blalock, 1975).

2 Boyd and Humphreys used Blishen's S.E.I. scores (analogous to Duncan's S.E.I. scores for the U.S.) to measure occupational status. We take issue with the use of S.E.I. scores, and have used an alternate measure of occupational status, namely the Pineo, Porter and McRoberts' sixteen-category socioeconomic classification of occupations (1977). Blishen scores are derived from education and the average income of the occupation and, as such, there is a "mechanical correlation" (Cain, 1974) between occupational status and education and between occupational status and income. Thus, it is not clear to what extent the causal connection between them is a fact of nature or an artifact of the research design. Blau and Duncan (1967:124-128) have attempted to answer this question by showing that the S.E.I. scores assigned to occupations do not change appreciably when education is removed as a component of the scores. However, when they repeat their analysis using this new measure of occupational status, all of their correlations and paths are slightly reduced. In short, our major criticism of the use of Blishen scores in an analysis of earnings determination revolves around the concern that, in so doing, the correlation between occupational status and income would be inflated. This concern seems justified as, in the male sample of gainfully employed, the correlation between Blishen scores and earnings is .47, as compared to .24 for the correlation between the Pineo-Porter-McRobert's scores and earnings. For females the correlation is .41, as compared to .19. A second concern with the use of Blishen scores is that those available for use in this study were established using educational and income characteristics for males, and the use of this measure for females has been seriously questioned (Guppy, et al., 1978), given their very different educational and income distributions. The scores attached to the Pineo Porter McRobert's categories are those recommended by the author.

3 Data on 1972 income are from the following question in the Canadian Mobility survey: "What was your income (before taxes) from employment during 1972? (Include wages, salaries, tips, commissions, etc., or if you have your own farm, business, or professional practice give your net income after deducting business expenses but before taxes)". Respondents were requested to check one of 19 precoded categories. The operationalization of the dependent variable--earnings--differed somewhat from that used by Boyd and Humphreys (1979). They estimated category-specific median income for the total population from the 1971 Census of Canada Public Use Sample Tape of Individuals and assigned a

dollar value to those respondents who indicated their employment income fell in a given category. They also omitted all those who reported a 1972 net loss from the analysis and, for those reporting a zero income, an income of one dollar was assigned. In this analysis all those reporting a zero income were dropped from the analysis (see Hauser, 1981), and the category midpoint is used to estimate earnings for each category, with the exception of the lowest and highest categories. Here, it was felt that the category midpoint might underestimate incomes at the bottom and the top. So, using Revenue Canada's Taxation Statistics for 1972 (Table 2, 1974), estimates for the lowest and highest income categories were calculated for males and females separately. For the category "less than $2,000", the estimates are $1,660 and $1,715 for males and females respectively. For the category "$20,000 and over", the estimate is $26,961 for both sexes.

4 Unionization could be added to the model of earnings determination in either of two ways: as a continuous variable or as a set of dummy variables with the lowest degree of unionization as the reference category. The first assumes a linear relationship between earnings and unionization, suggesting that the returns to earnings rise at a constant rate as the degree of unionization increases. The second does not assume a linear relationship and implies that the returns may not rise at a constant rate of return. It is possible to test the reasonableness of the linear assumption by comparing the results of two versions of the model using an F test on the increment to R^2. The null hypothesis that R^2 with unionization entered as a continuous variable equals R^2 with unionization entered as a set of dummy variable categories will be tested. If we fail to reject the hypothesis, then the conclusion is that nothing would be added to the model by considering unionization as a non-linear variable. The formula for the increment to R^2 test is:

$$F = \frac{(R_F^2 - R_R^2) / df_1}{(1 - R_F^2) / df_2}$$

where R_F^2 = coefficient of determination in the full model

R_R^2 = coefficient of determination in restricted model

df_1 = difference in number of (independent) unknown weights in full and restricted models

df_2 = N minus number of (independent) unknown weights in full model.

(Namboodiri, Carter and Blalock, 1975:87)

We tested these hypotheses on the full model and found the following statistics:

For Males:	For Females:
F = 13.26	F = 40.21

The critical region of F at = .01 is 4.61 and therefore we reject the null hypothesis. It seems that additional information is gained by treating unionization as a set of dummy variables. Therefore, we decided to enter unionization into the model as a set of dummy variables with the lowest degree of unionization as the reference category.

5 The average number of hours worked per week may be overestimated by our recoding of the CMS data. The original categories are 35 hours or more, 20-34 hours and less than 20 hours. We recoded these to 40 hours, 27 hours and 10 hours, resulting in a mean of 36.08 for women and 39.19 for men as shown in Table 7-2. More detailed data from the LFS indicate that the average hours worked per week for women during the reference week was 34.19. If the estimate of the average number of hours worked per week is overestimated, this would not in itself bias the amount of the earnings differential attributed to discrimination.

6 Equation for calculations for Chart 7-1:

$$Y = b_{26}X_{26} + b_{27}X_{27} + b_{28}X_{28} + b_{29}X_{29}$$

where X_{26} = years in the labour force
X_{27} = years in the labour force squared
X_{28} = years of age (see Table 7-3)
X_{29} = years of age squared

For 1 year of experience at 20 years of age:

Males $110.93(1) - 1.86(1) + 356.35(20) - 3.80(400) = 5716.07$

Females $94.80(1) - 1.43(1) + 124.28(20) - 1.45(400) = 1998.97$

difference = 3717.10

For 10 years of experience at 30 years of age:

Males $110.93(10) - 1.86(10) + 356.35(30) - 3.80(900) = 8361.20$

Females $94.80(10) - 1.43(10) + 124.28(30) - 1.45(900) = 3357.10$

difference = 5004.10

For 20 years of experience at 40 years of age:

Males $110.93(20) - 1.86(20) + 356.35(40) - 3.80(1600) = 10355.40$

Females $94.80(20) - 1.43(20) + 124.28(40) - 1.45(1600) = 4518.60$

difference 5836.80

For 30 years of experience at 50 years of age:

Males $110.93(30) - 1.86(30) + 356.35(50) - 3.80(2500) = 11589.60$

Females $94.80(30) - 1.43(30) + 124.28(50) - 1.45(2500) = 5390.10$

difference 6199.50

For 40 years of experience at 60 years of age:

Males $110.93(40) - 1.86(40) + 356.35(60) - 3.80(3600) = 12063.80$

Females $94.80(40) - 1.43(40) + 124.28(60) - 1.45(3600) = 5971.60$

difference $= 6092.20$

7 The increment to R^2 test, comparison of the full model versus the full model minus sectoral location, is as follows:

For Males:

$$F = \frac{(.424 - .421)/2}{(1 - .424)/(15807 - 29)} = 41.096$$

For Females:

$$F = \frac{(.496 - .493)/2}{(1 - .496)/(6886 - 29)} = 20.408$$

8 That is, for equations of the general form, one runs the model

$$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_1X_2$$

9 The increment to R^2 test for a linear additive model versus a sex interactive model is:

$$F = \frac{(.505 - .489)/29}{(1 - .505)/(22694 - 59)} = 27.586$$

10 It was not found necessary to do significant tests or show confidence levels on the decomposition of earnings between males and females since the sample of gainfully employed is so large that most differences will be found to be significant.

CHAPTER 8

INDUSTRIAL SECTORS AND THE DETERMINANTS OF EARNINGS: MALE-FEMALE DIFFERENCES

The review of the segmented economy literature in Chapter 3 suggested several possible sources of male-female differences in earnings. The present chapter will consider certain assumptions involved in and hypotheses related to these. In particular, it will address the following four questions:

(a) Do the returns to earnings-related characteristics vary across sectors, such that workers in the core and the state tend to receive higher returns to their human capital investments than do workers in the periphery?

(b) Within sectors, do men and women differ systematically in their average levels of earnings-related characteristics?

(c) Within sectors, are men and women differentially rewarded for their earnings-related characteristics?

(d) Within sectors, to what extent can male-female differences in average levels of earnings-related characteristics and differential returns to these characteristics be seen to contribute to male-female differences in earnings?

Intersectoral Differences in Economic Returns

In order to address the first question, employment income was regressed on the set of human capital and occupational status variables

within each sector separately for men and women. Table 8-1 shows the results of this analysis for men, while Table 8-2 shows the equivalent results for women. An inspection of Tables 8-1 and 8-2 suggests that the returns to many of the earnings-related characteristics do vary markedly across the three sectors. In order to test these differences for statistical significance, however, it is necessary to regress employment income on these characteristics, plus dummy variables for state and periphery and a set of interaction terms involving the product of each determinant and (a dummy variable for) state and each determinant and (a dummy variable for) periphery, for men and women separately across the three sectors. This is labeled the "sector interactive model". That is, to the model with twenty-five earnings-related factors (Tables 8-1 and 8-2), fifty interaction terms, plus dummy variables for state and periphery by themselves, have been added.

The sector interactive model has two advantages over separate equations for each of the three sectors. First, it allows a test for sector effects through the increment to R^2 test, when the sector interactive model is compared to the linear additive model (Namboodiri, et al., 1975). Second, if such effects are found, the sector interactive model permits an identification of those returns which differ significantly across sectors. The results from the sector interactive model are not reported directly, as equivalent returns are generated when the analysis is run separately for each of the three sectors, as in Tables 8-1 and 8-2.

The increment to R^2 test indicates that there are sector effects for males, since the addition of the sector and sector interaction terms

TABLE: 8-1

Determinants of Earnings by Sector, 1972, Males

	Metric Coefficients and Standard Errors					
	Core		Periphery		State	
Variables	B	S.E.	B	S.E.	B	S.E.
Status of Current Occupation	- 317.92*	19.73	- 325.48	16.02	- 223.99*	20.30
Weeks Worked Per Year	110.57	7.04	91.37	4.50	119.38	7.12
Hours Worked Per Week	38.17	21.06	83.16	11.12	95.59	14.71
Status of First Occupation	12.15*	20.72	-59.17*	15.66	-90.93*	19.66
Status of Father's Occupation	-28.11*	20.74	-114.93*	15.91	-19.72	19.30
Education	363.16	22.26	303.21	16.34	423.53	23.56
Years in Labour Force	167.98*	23.14	64.71*	15.51	152.22	23.38
Years in Labour Force Squared	-2.67*	.40	-1.10*	.27	-2.62	.38
Age	327.94	45.98	374.90	30.34	327.60	49.81
Age Squared	-3.42	.52	-4.11	.34	-3.26	.55
Career Interruptions (None)[a]						
Returned 10 years ago	-565.54	279.62	-521.00	250.14	-1050.43	286.07
Returned 5-10 years ago	-1048.95	496.41	-1644.71	405.26	-419.28	463.64
Returned 2-5 years ago	-1404.54	521.12	-1269.39	389.30	-1493.95	470.16
Returned 0-2 years ago	-1131.39	425.54	-1139.23	282.17	-1534.10	429.97
Never Returned Full-time	195.99	548.35	- 273.12	386.98	-85.05	644.73
Never Worked Full-time	108.34	402.24	6.64	269.19	876.30	431.76
Missing	-957.62	329.43	-542.17*	236.44	-1279.73*	345.15
Unionization Level (Low)[a]						
Medium	371.97*	174.68	429.35†	125.71	-1161.19*	268.25
Medium High	375.51*	170.23	1214.47*	115.36	549.34	176.14
High	969.91*	202.66	1558.69	220.03	17.92*	198.56
Missing	none		none		none	
Marital Status (Single)[a]						
Married	1224.10*	195.43	1440.11†	133.75	676.51	199.73
Separated	811.94	582.09	1867.66	386.02	677.74	528.75
Divorced	937.98	647.53	28.49	440.12	-218.40	777.82
Widowed	1539.11	699.13	1445.22	524.43	-309.04	725.82
Missing	944.72	1264.65	386.16	894.57	1113.27	982.60
Intercept	-8073.53*	1192.31	-7099.51*	769.58	-11220.29	1161.52
R^2	.42		.38		.51	

a Refers to the reference category.

* Signifies that when the equations are treated as a single equation with dummy variables for periphery and state (with core as the reference category) the sector interactive term is statistically significant from zero (at the .01 level) using an F test.

\- Signifies that when the equations are treated as a single equation with a dummy variable for gender, the gender interactive term is statistically significant from zero for the continuous variables and from the omitted category from dummy variables using an F test at the .01 level or better.

† Signifies that when the equations are treated as a single equation with a dummy variable for gender, an F test on the set of dummy variable interaction terms indicated significance.

TABLE: 8-2

Determinants of Earnings by Sector, 1972, Females

Variables	Metric Coefficients and Standard Errors					
	Core		Periphery		State	
	B	S.E.	B	S.E.	B	S.E.
Status of Current Occupation	-112.20*	19.83	-194.44*	14.21	-151.37	16.30
Weeks Worked Per Year	67.56*	4.28	47.94*	2.62	80.25	3.78
Hours Worked Per Week	52.30	8.42	57.06	4.07	73.46	6.01
Status of First Occupation	-28.75	21.40	-45.95	14.19	-77.18	16.09
Status of Father's Occupation	-36.01	15.72	-47.56	11.71	-31.44	13.40
Education	159.82*	25.12	81.47*	14.32	375.07*	22.81
Years in Labour Force	61.95	18.63	78.79	11.29	106.84	15.93
Years in Labour Force Squared	-.74	.37	-1.32*	.22	-1.33	.32
Age	148.38	37.45	54.52	20.33	203.62	30.14
Age Squared	-1.66	.47	-.74	.24	-2.28	.36
Career Interruptions (None)[a]						
Returned 10 Years Ago	-172.37	212.99	-205.09	138.39	286.72	172.35
Returned 5-10 Years Ago	-761.87*	224.16	1.23*	151.47	-504.38	183.98
Returned 2-5 Years Ago	-451.31	216.25	-154.78	147.34	-731.89	183.74
Returned 0-2 Years Ago	-849.94	204.83	-382.51	131.24	-706.65	174.67
Never Returned Full-time	539.18	347.62	5.00	166.67	-227.75	257.51
Never Worked Full-time	-89.28	289.97	449.98	160.67	660.80	246.68
Missing	-626.78	288.81	-136.52	162.03	-604.38	223.16
Unionization Level (Low)[a]						
Medium	213.95	133.69	226.39†	98.79	96.98	128.32
Medium High	121.24*	133.15	252.07	116.34	614.02*	126.37
High	486.67	240.79	802.61	288.88	179.24	173.69
Missing	none		none		none	
Marital Status (Single)[a]						
Married	127.75	123.47	282.22†	94.59	-220.15	108.47
Separated	288.45	279.22	143.41	200.60	157.94	266.99
Divorced	552.08*	301.54	665.02	243.80	-457.86*	262.89
Widowed	426.62	346.04	380.43	185.17	-208.13	246.62
Missing	1528.69	1283.48	-362.85	630.39	-1888.79	1362.04
Intercept	-3515.27	885.29	470.88	515.94	-7842.11	732.63
R^2	.43		.37		.59	

a Refers to the reference category.

* Signifies that when the equations are treated as a single equation with dummy variables for periphery and state (with core as the reference category) the sector interactive term is statistically significant from zero (at the .01 level) using an F test.

\- Signifies that when the equations are treated as a single equation with a dummy variable for gender, the gender interactive term is statistically significant from zero for the continuous variables and from the omitted category from dummy variables using an F test at the .01 level or better.

† Signifies that when the equations are treated as a single equation with a dummy variable for gender, an F test on the set of dummy variable interaction terms indicated significance.

to the full model increases R^2 significantly ($F = 4.00$).[1] These findings are not consistent with those reported by Boyd and Hymphreys (1979) for a sample of Canadian-born, full-time workers, but they are in line with results reported in empirical studies in the U.S., where differential returns to earnings-related characteristics have been observed across sectors (Beck, et al., 1978, 1981). Specifically, tests for interaction in the model for men show that, relative to those in the core, men in the state receive less for present occupational status, but more for status of first occupation. Also, relative to men in the core, men in the periphery receive more for status of first and father's occupations, but much less for each year in the labour force. The (negative) returns to years in the labour force squared, however, are smaller for men in the periphery than in the core. Further, men who are employed in state industries with medium and high levels of unionization earn much less than do their counterparts in the core. Finally, those employed in periphery industries with medium levels of unionization earn much more than their counterparts in the core. Statistically significant differences in returns across sectors have been indicated by an asterisk (*) in Table 8-1.

The story for women is similar to that for men. Sectoral effects and differences in returns across sector do exist for women in the labour force ($F = 11.59$). Tests for interaction show that, relative to those in the core, women in the state receive a higher return to each year of education, and those in the medium-high category of unionization receive a higher return to unionization than do their counterparts in the core. Also, divorced women employed in the state sector appear to be at an economic disadvantage relative to their counterparts in the core. Women in the

periphery receive substantially less for each year of education and week worked per year, but substantially more for their occupational status, than do women in the core. These statistically significant differences have been marked by asterisks in Table 8-2.

There are important intersectoral differences in the returns to unionization. Since little research has been done on the relationship between unionization and earnings, we will provide a somewhat more detailed analysis of differences in returns across sectors, especially within the state sector. Overall, the periphery is not highly unionized, with almost sixty per cent of the periphery men and seventy-five per cent of the periphery women in industries with low levels of unionization (see Table 6-6). Apparently, though, unionization does contribute very substantially to determining earnings in this sector. For both men and women in the core and periphery, the relationship between earnings and unionization appears to be approximately linear, but unionization yields much higher economic returns in the periphery than in the core. For example, men employed in periphery industries of medium-high unionization receive returns which are three times as great as those of their counterparts in the core.

In the state, the relationship between earnings and unionization is complex. Overall, the state sector is highly unionized, with over seventy-five per cent of the men and almost fifty per cent of the women in industries with medium-high or high levels of unionization (see Table 6-6). Chart 8-1 shows the composition of 3-digit industries by unionization for the three industrial classifications which compose the state. Using this table, it becomes possible to disentangle the

CHART: 8-1

State Industries by Unionization

Unionization	Public Utilities	Government Regulated Services	Public Administration
Low	Male N = 147 Female N = 2 Highways and Bridge Maintenance Water Systems Other Utilities	Male N = 332 Female N= 487 Kindergarten and Nursery Schools Schools of Art and Performing Arts Post Secondary, Non University Educational Institutions Universities and Colleges Library, Museums Welfare Organizations	Male N = 106 Female N = 49 Defense Services
Medium Low	Male N = 21 Female N= 4 Telegraph and Cable Systems	Male N = 287 Female N= 917 Hospitals Related Health Care Institutions	
Medium High	Male N = 549 Female N= 225 Air Transport Urban Transport Systems Telephone Systems Electric Power	Male N = 556 Female N = 584 Elementary and Secondary Schools Education and Related Services Miscellaneous Health Services	Male N = 984 Female N= 251 Other Federal Administration Local Administration Other Government Services
High	Male N = 579 Female N= 97 Services Incidental to Air Transportation Railway Transport Post Office		Male N = 394 Female N = 189 Provincial Administration

relationship between unionization and earnings in the state. For example, the large negative return to medium-low unionization for men is importantly the result of this grouping being largely composed of workers in hospitals and related health care institutions. Relative to those in the (low unionization) reference group, this group is significantly disadvantaged in terms of income. Also, relative to the reference group, neither men nor women in an industry of high unionization such as the post office or the provincial administration benefits much in terms of earnings.

Do the three sectors differ in the ways in which earnings-related characteristics are remunerated? The answer for men is a tentative "yes". That for women is a more confident "yes". Moreover, the observed pattern of intersectoral differences does reveal a general tendency for workers in periphery industries to receive lower returns to human capital investments (and higher returns to such factors as occupational status) than workers in either the core or the state.

Male-Female Differences in Earnings-Related Characteristics

Within each sector, then, do men and women differ systematically in their average levels of earnings-related characteristics? Table 8-3 and 8-4 show the means and standard deviations for the set of earnings-related characteristics for each sector for males and females, respectively. A visual comparison of Tables 8-3 and 8-4 suggests that there are large differences between the sexes in their average levels of certain earnings-related characteristics. In particular, within each sector, the men appear to be higher than the women on weeks worked per year, hours worked per week, years in the labour force, unionization, and proportion

TABLE: 8-3

Means and Standard Deviations of Variables by Sectors, Males

Variables	Core		Periphery		State	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Income	8985.24	4938.89	7816.99	5244.33	9491.14	4996.82
Status of Current Occupation	10.10	3.87	10.05	3.62	8.77	4.44
Weeks Worked per Year	46.11	9.68	44.45	11.10	46.47	9.47
Hours Worked per Week	39.53	2.94	39.11	4.19	39.00	4.09
Status of First Occupation	11.49	3.61	11.43	3.67	10.10	4.51
Status of Father's Occupation	10.80	3.08	10.72	2.99	10.45	3.23
Education	10.61	3.36	10.43	3.51	11.84	3.75
Years in Labour Force	18.30	13.63	18.30	14.66	18.86	13.82
Years in Labour Force Squared	520.61	653.18	549.76	733.15	546.85	663.38
Age	38.41	12.76	38.90	13.51	40.24	12.52
Age Squared	1638.73	1056.86	1696.19	1143.88	1776.44	1049.56
Career Interruptions:						
None	.81	.40	.80	.40	.82	.39
Returned 10 years ago	.05	.22	.04	.18	.05	.21
Returned 5-10 years ago	.02	.12	.01	.11	.02	.13
Returned 2-5 years ago	.01	.12	.01	.12	.02	.13
Returned 0-2 years ago	.02	.15	.03	.16	.02	.14
Never Returned Full-time	.02	.13	.02	.13	.01	.10
Never Worked Full-time	.04	.19	.06	.23	.04	.20
Missing	.04	.19	.04	.19	.03	.17
Unionization Level:						
Low	.22	.42	.56	.50	.15	.35
Medium	.30	.46	.17	.38	.07	.26
Medium High	.32	.47	.22	.41	.54	.50
High	.16	.36	.05	.21	.24	.43
Marital Status:						
Single	.16	.37	.19	.40	.15	.35
Married	.81	.40	.76	.42	.82	.38
Separated	.01	.11	.02	.12	.01	.11
Divorced	.01	.10	.01	.11	.01	.08
Widowed	.01	.09	.01	.09	.01	.09
Missing	.00	.05	.00	.05	.00	.06
Number in Sample	3,851		8,428		3,518	

TABLE: 8-4

Means and Standard Deviations of Variables by Sectors, Females

Variables	Core		Periphery		State	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Income	4703.15	2329.70	3809.17	2389.73	5700.45	3283.16
Status of Current Occupation	10.47	3.01	10.78	2.99	8.07	4.21
Weeks Worked per Year	43.14	12.97	40.71	14.16	42.90	12.58
Hours Worked per Week	37.81	6.23	35.13	9.20	36.38	7.81
Status of First Occupation	11.06	2.85	10.74	3.04	8.43	4.30
Status of Father's Occupation	10.52	3.25	10.74	3.04	10.06	3.41
Education	11.38	2.40	10.72	2.92	12.65	2.53
Years in Labour Force	10.62	10.85	10.83	11.80	10.87	10.97
Years in Labour Force Squared	230.41	455.32	256.48	518.38	238.41	460.86
Age	32.81	12.07	37.49	13.53	36.57	13.04
Age Squared	1223.15	919.73	1589.03	1090.34	1507.88	1046.47
Career Interruptions:						
None	.62	.49	.49	.50	.55	.50
Returned 10 years ago	.08	.27	.09	.28	.09	.29
Returned 5-10 years ago	.06	.24	.06	.24	.07	.26
Returned 2-5 years ago	.06	.24	.07	.25	.07	.25
Returned 0-2 years ago	.08	.27	.09	.28	.08	.27
Never Returned Full-time	.03	.17	.07	.26	.05	.21
Never Worked Full-time	.04	.21	.08	.27	.05	.22
Missing	.03	.18	.05	.22	.04	.20
Unionization Level:						
Low	.55	.50	.74	.44	.18	.39
Medium	.21	.41	.14	.35	.33	.47
Medium High	.19	.39	.10	.30	.39	.49
High	.05	.21	.01	.11	.10	.30
Marital Status:						
Single	.32	.47	.25	.43	.31	.46
Married	.58	.49	.64	.48	.59	.49
Separated	.04	.19	.04	.19	.03	.17
Divorced	.03	.17	.02	.15	.03	.18
Widowed	.03	.17	.05	.22	.04	.20
Missing	.00	.04	.00	.05	.00	.03
Number in Sample	1,322		3,157		2,397	

married, while the women seem to be higher than the men on number of career interruptions. As well, in both the core and state sectors, the women appear to be better educated than the men, and the men older than the women. Finally, in the state sector, the men seem to be higher than the women on status of first occupation.

For the analysis which follows, the importance of the male-female differences noted above lies not so much in whether they are statistically significant as in how they might contribute to an understanding of male-female earnings differentials. That is, insofar as these characteristics are related to earnings, then some part of the male-female earnings gap could derive from male-female differences in average levels of these characteristics within each sector. Consequently, these differences in average levels will not be tested for statistical significance or analyzed in further detail here. Instead, they will later be brought into the analysis to assess the importance of compositional differences between men and women for earnings inequalities within each sector.

Male-Female Differences in Economic Returns

A visual inspection of the data presented in Tables 8-1 and 8-2 suggests that, within each sector, men and women differ in their economic returns to a number of earnings-related characteristics. Unlike the immediately preceding analysis, however, these are not simple, zero-order comparisons, so that it might be useful to conduct formal tests of significance on them. To do this, the procedure employed in the last chapter to test for a gender interaction will be followed. For <u>each</u> sector, using a combined sample of males and females, two different models of earnings

determination are compared. The first regresses earnings on all twenty-five determinants, plus a dichotomous gender variable, in a linear additive model. The second regresses earnings on all twenty-five determinants, plus a dichotomous gender variable and the products of gender and each of the earnings-related characteristics. The second tests for the presence of interaction between gender and each of the determinants, on the rationale that, if the linear additive and gender interactive models are compared using an increment of R^2 test, the interactive model will explain significantly more variance than the first model, if there are differential returns by gender. When these tests are made, the F statistic is in the critical region at the .01 level for all three sectors,[2] indicating that, in each sector, gender does interact with one or more of the earnings-related characteristics. The results from the gender interactive model are not reported directly, as equivalent returns are produced when the analysis is run separately for males and females within each economic sector, as in Tables 8-1 and 8-2.

Those earnings-related determinants which differ significantly between men and women within each sector are indicated in Tables 8-1 and 8-2 where the regression coefficients are underscored. As these data show, except for hours worked per week and status of father's occupation, there is no variable or set of dummy variables in which men and women do not differ within at least one sector in their economic returns. Furthermore, there are four variables in which such differences appear in each of the three sectors. Specifically, men receive a higher return than women in each sector to current occupational status, weeks worked per year, and being married (as opposed to being single), while years in the labour force

squared reveals a pattern in which men in the core and the state lose more than their female counterparts and women in the periphery lose more than their male counterparts.

In both the core and the periphery, men receive a higher return than women to each year of education and to being widowed, while men in the periphery receive a higher return than women to medium-high (vs. low) unionization and women in the state receive a higher return than men to medium-high unionization. Beyond this, there are a number of sector-specific differences. In the periphery, men receive a greater return than women to status of first occupation, age, and being separated, while they receive a larger (negative) return than women to age squared and having returned from a career interruption either 5-10 or 2-5 years ago. Men in the state receive a larger (negative) return than women to having returned from a career interruption 10 or more years ago, while men in the core receive a higher return than women to years in the labour force.

Perhaps the most pronounced pattern which emerges from a comparison of Tables 8-1 and 8-2 is that of the differences between men and women who are employed in periphery industries, thirteen of which were found to be statistically significant. Moreover, in most of these cases, it was the women who were found to receive less. At the same time, however, the particular relevance of these differences for the present analysis lies in their importance for explaining male-female earnings inequalities. Consequently, they will not be discussed further here, but will be put to use in the following section.

Intersectoral Differences in Male-Female Earnings Differentials

As demonstrated above, there are large differences in the average earnings of people employed in different economic sectors, with those in the state earning more than those in either the core or the periphery. Also, economic sector has been shown to affect the earnings of both men and women independently of the effects of an extended set of other earnings-related characteristics. From the segmented economy literature, however, one would expect that the male-female earnings gap, net of other factors, varies systematically by sector. Specifically, it seems to be a matter of considerable agreement among segmented economy theorists that this gap will be greater in the periphery than in either the state or the core. Or, to phrase this in another way, the expectation is that gender earnings discrimination is greater in the former than in the latter.

The first row of Table 8-5 shows the actual male-to-female earnings gaps in each of the three sectors, while the first row of Table 8-6 shows the corresponding female-to-male earnings ratios. As these data indicate, women's earned incomes are lowest relative to men's in the periphery and highest in the state. At the same time, the three sectors do differ in the average levels of the earnings-related characteristics of the men and women employed in them, so that this pattern could be a consequence of the fact that the men and women in some sectors differ more from one another in their earnings-related attributes than they do in other sectors. Employing the "interaction model" presented in Chapter 7 (Table 7-4), the differences between the mean values for the earnings-related characteristics of the men and women (Tables 8-3 and 8-4) can be used with the regression coefficients for the women (Table 8-2) in order

TABLE: 8-5

The Male-Female Earnings Gap Subdivided Into the Four Components of Earning Inequality by Sectoral Location Employing the Interaction Model

	Sectoral Location			
	Core	Periphery	State	Total
Total Mean Income Gap	$4,282.09*	$4,007.83	$3,790.70	$3,834.26
Amount Due to Composition	775.96	837.54	661.47	647.34
Amount Due to Returns	7,125.59	9,990.31	5,624.93	8,143.35
Amount Due to Interaction	959.98	790.78	872.16	745.47
Amount Due to Intercept	- 4,558.26	- 7,570.39	- 3,375.18	- 5,650.87

* The components do not add up to the total mean income gap because of rounding errors using two significant decimal places only in the calculations.

TABLE: 8-6

Actual and Predicted Female-to-Male Earnings Ratios by Sectoral Location

	Sectoral Location			
	Core	Periphery	State	Total
Actual Ratio of Female-to-Male Earnings	.52	.49	.60	.55
Predicted Ratio Under the Assumption Equal Means	.61	.59	.67	.62
Predicted Ratio Under the Assumption of Equal Rates of Return	1.32	1.77	1.19	1.51
Predicted Ratio Under the Assumption of Equal Rates of Return and Interaction	1.42	1.87	1.29	1.59
Predicted Ratio Under the Assumption of Equal Earnings Process	.92	.90	.93	.92

to estimate the additional income which the women would have earned had they not differed from the men in these characteristics. The results of this exercise are shown in the second row of Table 8-5, while the corresponding row of Table 8-6 shows the female-to-male earnings ratios adjusted for compositional differences. As these data indicate, the overall pattern of adjusted earnings gaps and ratios is the same as that for the actual ones. That is, even taking into account the differences between men and women in the average levels of their earnings-related characteristics, women's earnings are lowest relative to men's in the periphery and highest in the state.

As described in Chapter 7, a male-female earnings gap which remains after the compositional differences between the two groups have been taken into account can be shown to derive from three sources which, when taken together, define the differences between men and women in the processes by which they earn income. These sources are: (1) differences between them in the economic returns to earnings-related characteristics, (2) differences between them which arise when one group is higher than the other in both average levels and economic returns, i.e., the "interaction" effect, and (3) other, unexplained differences due to sex. Since, in the present chapter, it has already been shown that there are differences between men and women within each of the three sectors in their returns to several earnings-related characteristics, it would be useful to identify how these three sources of earnings inequalities influence male-female earnings differentials in the core, the periphery, and the state. That is, to what extent do the male-female earnings differentials in each of the three sectors derive from male-female differences in economic returns, inter-

action, and unexplained differences due to sex?

What, then, of differences between men and women in their economic returns? To solve for the expected average earnings for women on the assumption of equality with male returns, the unstandardized regression coefficients for the men (Table 8-1) are used with the means and intercept for females (Table 8-4). With this, we find that the mean income for women would increase by $7,126, $9,990 and $5,625 to $11,429, $13,199 and $9,416 in the core, the periphery, and the state, respectively (third row, Table 8-5). Or, to express these results somewhat differently, if women received the same returns to each of their earnings-related characteristics as men did, the female-to-male earnings ratios would increase to 1.32, 1.77 and 1.19 in the core, the periphery, and the state, respectively (third row, Table 8-6). As for the interaction effect, it turns out that women's earnings would increase by an additional $960 in the core, $791 in the periphery, and $872 in the state if the women had both the same average levels of earnings-related attributes and the same economic returns to these attributes as the men do (fourth row, Table 8-5). This results in adjusted female-to-male earnings ratios of 1.42, 1.87, and 1.29 in the core, the periphery, and the state, respectively (fourth row, Table 8-6). Finally, the unexplained-differences-due-to-sex component is reflected in the differences between the intercepts for the equations for men and women. The male-female intercept difference is -$4,558 in the core, -$7,570 in the periphery, and -$3,375 in the state (fifth row, Table 8-5). When these figures are used to adjust the female-to-male earnings ratios in the three sectors, the results are that, if women received earnings by the same process as the men do, the female-to-male earnings ratio would

drop to .92 in the core, .90 in the periphery, and .93 in the state (fifth row, Table 8-6).

In sum, there are two sources of gender income inequality--differences in the average male-female earnings attributes and differences in the process by which men and women earn income. Of the two, the second is by far the more important. Furthermore, there appear to be important variations across sectors in the contributions that each of these sources make to explaining gender earnings differences. In the periphery, men and women differ substantially in the average level of the income-related characteristics they bring to the job, while in the state, followed by the core, these differences are somewhat reduced. Also, the returns to earnings-related characteristics are more similar for men and women in the state than in either the core or the periphery. In particular, men and women earn the same returns to education and experience in the state, while there are significant gender differences in returns to these factors in the core and the periphery. Moreover, in the periphery, there are many more significant gender differences in the returns to earnings attributes than in the core or state so that in the periphery, the income attributes which women bring to the job matter very little for their earnings.

FOOTNOTES

1 Utilizing the increment to R^2 test, comparison of the full model (no sectoral location) to a sector interactive model show:

For Males:

$$F = \frac{(.432 - .421)/ 50}{(1 - .432)/(15797 - 78)} = 4.00$$

For Females:

$$F = \frac{(.533 - .493)/ 50}{(1 - .533)/(6877 - 78)} = 11.59$$

2 Employing an increment to R^2 test, comparison of the full model, to a sex interactive model indicate that:

For the core:

$$F = \frac{(.514 - .493)/ 25}{(1 - .514)/(5173 - 51)} = 8.84$$

For the periphery:

$$F = \frac{(.462 - .442)/ 25}{(1 - .462)/(11585 - 51)} = 17.17$$

For the state:

$$F = \frac{(.602 - .588)/ 25}{(1 - 602)/(5915 - 51)} = 8.24$$

CHAPTER 9

SUMMARY, DISCUSSION AND CONCLUSIONS

This research has considered a number of hypotheses suggested by segmented economy theory and the literature on gender earnings discrimination concerning sources of male-female earnings inequalities. In the present chapter, the major findings are brought together and some of their more important implications discussed. In particular, the following questions have been addressed:

(a) How do economic sectors differ in their employment characteristics and in their labour force compositions?

(b) Are males and females differentially allocated to economic sectors and, if so, what are the consequences of this for male-female differences in earnings?

(c) Do the returns to earnings-related characteristics vary across economic sectors, such that workers in the core and state tend to receive higher returns to their human capital investments than do workers in the periphery?

(d) Within sectors, do men and women differ systematically in their average levels of earnings-related characteristics?

(e) Within sectors, are men and women differentially rewarded for their earnings-related characteristics?

(f) Within sectors, to what extent can male-female differences in average levels of earnings-related characteristics and differential returns to these characteristics contribute to male-female differences in earnings?

What answers, then, have been given to these questions, and what are some of their implications for sociological theory and research?

Sector Differences in Employment Characteristics and Labour Force Composition

Segmented economy theory suggests that the state, the core, and the periphery are distinguished from one another in terms of monopoly vs. competition and type of economic organization which, in turn, influence their employment characteristics and labour force compositions. (See Chapter 6 for the distinction between employment characteristics and labour force composition.) With regard to employment characteristics, the periphery is found to be characterized by an over-representation of part-time and intermittent workers with limited work experience, and of women with interrupted careers. Also those clerical, sales and service occupations which require less skill are over-represented in the periphery, and periphery sector workers are disproportionately located in industries with low rates of unionization. The core has an over-representation of full-time workers with extensive work experience and continuous work histories, as well as workers in skilled clerical, sales and service, craft and trade occupations. Too, the bargaining position of workers in the core is relatively strong, as indicated by the high rates of unionization among core industries. In the state sector, the proportion of workers employed part-time or intermittently is greater than in the core, although it does not reach the level in the periphery. The state does have a well-educated, experienced labour force, and it is the most highly unionized sector of the three. Also, the occupational composition of the state is quite different from those of the other two sectors, with the state having a mugh larger proportion of professional, as well as of unskilled clerical, sales and service, occupations.

The three sectors, then, were found to differ importantly in their employment characteristics, and these findings lend clear support to the notion of a multi-sector economy. Moreover, these differences are, in general, in the direction hypothesized by segmented economy theory--with one major exception. For men, the sectors were not found to differ in terms of employment stability; for women, however, they were found to differ sharply in this respect. Proportionately more employed women with no major career interruptions were located in the core than in the state, followed (in turn) by the periphery.

Along with the differences among them in their employment characteristics, the three sectors were also found to differ in their labour force compositions. While these differences are complex, two clear findings did emerge. First, both men and women in the state sector are better educated than are those in the other two sectors. Second, those women with low levels of education, little work experience, and major career interruptions, who are married, and who have children are disproportionately located in the periphery sector. Again, these differences are in the direction predicted from segmented economy theory.

The Differential Allocation Hypothesis

An inference from segmented economy theory is that earnings in the state will not differ significantly from those in the core, but that earnings in both of these will be substantially greater than those in the periphery. Earnings in the periphery were found to be much lower than in either the core or the state, while those in the state and the core were roughly equivalent. When these differences were broken down by gender, it was found that, for both men and women, earnings in the state

were much higher than in the core and earnings in the periphery were substantially lower than in either of the other two sectors. Also, in all three sectors, earnings for males exceeded those for females, with the largest gap in the periphery and the smallest in the state.

Segmented economy theory suggests that one mechanism which may contribute to the earnings gap between the sexes is their differential allocation to sectors, and it was found that females are under-represented in the core and over-represented in the state. Examining this differential allocation of the sexes to the sectors of the economy, however, the results indicate that, if females in Canada were distributed across economic sectors, in the same proportions as males are, there would be no substantial change in their aggregate earnings. This is true because the under-representation of females in the high-paying core sector is counterbalanced by their over-representation in the even higher-paying state sector.

These findings appear to differ from those reported for the United States, where the differential allocation of men and women to sectors is thought to be an important contributor to male-female differences in earnings (Beck, et al., 1980). In Beck, et al.'s analysis, however, Tolbert, et al.'s(1980) scheme for classifying industries along an oligopoly-competitive dimension is employed, in which the economy is dichotomized into a periphery sector and a sector which combines both core and state. Consequently, it could be that the differences between Beck, et al.'s findings and those reported here originate in the differences between the two studies in the manner in which economic sector are differentiated

Intersectoral Differences in Returns

What does the effect of sectoral location on earnings determination for men and women seem to be? As we have shown, both males and females employed in the periphery earn less than do those who work in the core, and those in the state earn significantly more than do those who work in either the core or the periphery. These differences appear to come about partly as a result of differences among the sectors in employment characteristics and labour force composition. When the three sectors are equated in terms of these, the earnings disadvantage for males in the periphery is cut by half, and the earnings advantage for males in the state turns into an earnings disadvantage. For females, equating the sectors in terms of their employment characteristics and labour market compositions reduces their earnings disadvantage in the periphery, and virtually eliminates their earnings advantage in the state.

These results are not surprising. One would expect that, since the three sectors differ in their employment characteristics and labour force compositions, when these differences are controlled, some portion of the earnings differences among them would disappear. What is important for this analysis, though, is that these earnings differences are not entirely compositional. So, even when the sectors are equated in terms of their employment characteristics and labour market compositions, substantial differences among them remain. It may be, then, that there are important differences among the sectors in the manner in which earnings are determined.

Segmented economy theory implies that the earnings determination process differs across industrial sectors of the economy, such that

workers in the core and state receive higher economic returns to their human capital factors, such as education, seniority and career stability, than do workers in the periphery. As shown in this research, the data largely bear this out. The three sectors do appear to differ in the ways in which certain earnings-related characteristics are remunerated. These differences in returns to human capital variables are greater for women then they are for men, and they are generally in accord with findings from similar studies (see Boyd and Humphreys, 1979 and Beck, et al., 1980). Also these differences explain the differences which remain among the sectors in average earnings when the sectors have been equated in terms of employment characteristics and labour market composition.

Intersectoral Differences in Male-Female Earnings Differentials

Throughout this dissertation, the question has been asked: What might account for the fact that men who are employed earn about twice as much as employed women do? The analysis presented above suggests that the answer lies largely in the very different processes by which men and women earn income and, to a much smaller extent, in the differences between them in the average levels of their earnings-related characteristics. Relative to women, men are paid substantial returns to their earnings-related characteristics such that, if women were paid according to the same criteria as men, the female-to-male earnings ratio would increase from an estimated .55 to .62.

There is, however, more to the male-female earnings gap than just differences between the sexes in levels of and returns to earnings-related characteristics. Specifically, it appears as if the differences between

men and women in their economic returns and average levels of earnings-related characteristics are not the same from sector to sector. The findings reported above support two general conclusions in this regard. First, differences in returns for men and women are more frequent in the periphery than in either the core or the state. Second, while still distinct, the processes by which men and women earn income are more similar in the state than in either the core or the periphery. In the state, men and women receive nearly equivalent economic returns to their human capital factors, such as education and experience, while this is not the case in the other two sectors.

The major intersectoral difference, then, appears to be between the state, on the one hand, and the two private sectors, on the other. Specifically, the processes by which men and women are paid seem to be more rationalized in the state than in either the core or the periphery so that, regardless of gender, employees are remunerated for their human capital attributes. Or, to describe the situation in different terms, the evidence is that the state is a more meritocratic employer than either the core or the periphery. What, then, might account for this? And what are some of the implications of these findings for sociology and, perhaps as well, for social policy?

Economic Sectors, Gender Earnings Discrimination, and Social Theory

Does gender earnings discrimination vary systematically by economic sector in Canada? The answer would appear to be "yes". But what might account for the particular pattern of discrimination revealed in this research? While after-the-fact speculation can provide no definitive answers to this question, it is necessary at least to consider what the

possible reasons for it might be.

The first theoretical contender which must be weighed in as a source of possible explanations for gender earnings discrimination is neoclassical economic theory--especially that application of neoclassical economics known as human capital theory--since segmented economy theory largely originates in a critique of that perspective. Human capital theory carries with it assumptions that workers seek to maximize their returns and employers their profits by means of rational, informed decisions made under conditions of free competition. In terms of human capital theory, employers who discriminate against some category of people by not hiring them at all, paying them less for their labours, or holding them back in their promotions do so at a risk of profits foregone. If they decline to hire members of some category of potential employees, some of their competitors will hire them at reduced rates of pay and reap the benefits of cheap labour. If they only take on members of some category at lower rates of pay or are slow to promote them, some of their competitors will lure them away with offers of higher wages or better promotional opportunities. In either case, employers who discriminate will pay for the privilege, and discrimination will exist only as a short-run market imperfection. And, where such discrimination exists, it is most likely to be found in noncompetitive markets, such as that part of the private sector which is dominated by a small number of very large corporations and, especially, the state sector, both of which are less checked by natural market forces, though the state sector may be checked by political forces. The conclusion reached here, then, is precisely the opposite to that recently predicted, for example, by a neoclassically

oriented Canadian economic institute (Block and Walker, 1982). That is, gender earnings discrimination is greatest in the periphery sector and least in the state sector.

Contrary to neoclassical economic theory, then, gender market discrimination is an enduring fact of the Canadian economy. Moreover, it can be shown to vary in magnitude from economic sector to economic sector, and it is most pronounced in just that sector where a neoclassical economist would normally expect it to be least evident. These observations cause one to question the utility of an unreconstructed neoclassical economic point of view for making sense of certain phenomena which fall within its scope. Perhaps the assumptions upon which it rests must be modified to accommodate the fact that there is no one, homogeneous economy, and that some economic sectors are more competitive than others. Even so, however, we would still be left with the problem of accounting for how it is that it is the most competitive markets which are also the most discriminatory.

A second contender is dual labour market theory, which is sometimes linked to a segmented economy perspective. As with the segmented economy theory literature, writings on dual labour market theory have yet to come together to form a single, well-articulated set of ideas, so that it is not possible to summarize them briefly or simply. As discussed in Chapter 3, the organizing principle of this approach is that the labour market is best seen as existing in two or more sectors, between which there is very limited mobility. These sectors include an upper tier of primary sector jobs of a professional or managerial character with high pay, good working conditions, and real opportunities for career advancement, a lower tier of primary jobs in sales, clerical work, and skilled labour which are steady and moderately remunerative, and a secondary sector of low paid, unpleasant, "dead end" jobs. In addition, internal labour markets which are

typically found within single business firms, divisions, or plants, can be distinguished from the external labour market.

As it brings insights into the phenomena of gender earnings discrimination, dual labour market theory points particularly to the fact that men are disproportionately found in the upper tier of primary sector jobs and women in the lower tier of primary and in secondary sector jobs. But, while dual labour market theory does elaborate a typology of different kinds of jobs, and this is useful in seeing something of the differences between men and women in the jobs which they have, it does not in itself appear to provide an explanation for how men and women come to be segregated into different sectors, much less of how it is that men and women who are similar in their earnings-related attributes differ in their earnings.

A third theoretical contender which must be considered is Marxism. It is not a difficult inference from general Marxist principles that capitalism carries with it tendencies for market discrimination which serve the interests of the bourgeoisie by, among other things, increasing the appropriation of surplus value. From a broadly Marxist perspective, then, some kinds of market discrimination, including gender earnings discrimination, are to be expected in capitalist economies. At the same time, it is not clear from Marxist theory why gender wage discrimination should be much less pronounced in the state sector as over against the private sectors, since the assumption is that, while the state sector is not a simple tool of the bourgeois class, it nevertheless acts in the interest of that class in the long run. It is true that the state sector does not have the same requirements for surplus value that the private sectors do but, as a relatively nondiscriminatory employer--at least in

respect to the sexes and their wages--it can not easily be seen as furthering the interests of the bourgeoisie in that respect. Just as plausibly, it can be seen as setting a precedent which is not in the interest of that class.

The fourth and last theoretical contender to be considered, and the one on which this research has been primarily focused, is segmented economy theory. Does the conception of a segmented economy add anything to our knowledge of the sources of male-female earnings discrimination? The findings presented above suggest an affirmative answer to this question. Gender earnings discrimination is greater in some sectors than in others. At the same time, there is virtually nothing in the segmented economy literature which seems to cast any light on the fact that such discrimination appears to be structured according to whether the sectors are characterized by private, as opposed to public, ownership. In fact, the predominant model of the segmented economy is that of a dual economy in which a private, competitive sector is counterposed against a noncompetitive sector composed of both private and public enterprises, whereas the present research seems to suggest the utility of a dual economy model in which a private sector is contrasted with a public one.

Neoclassical economics/human capital theory, dual labour market theory, Marxism, and segmented economy theory largely exhaust the list of likely candidates to explain the intersectoral pattern of gender earnings discrimination observed here. Since none of them appears adequately to account for this pattern, however, we are left to speculate. First, gender wage discrimination seems to migrate with the demand for profits, i.e., it is greatest in the private sectors, where profits are a necessary condition for survival and growth, and least in the state sector, where the

concept of profit does not generally apply. This suggests that it may be both in the interest of and within the power of employers to discriminate against women in their wages in the private sectors, but not (or much less so) in the state sector. Second, the evidence (e.g. Villemez, 1977) suggests that wage discrimination against women may benefit men economically, although Villemez points out that "The whole issue of male gain or loss from female inequality is an extremely complex one" (p. 633). So if it is to the benefit of men to have employers discriminate in favour of them in their wages, this would help explain how it is that gender wage discrimination is to be found to some degree in every sector of the economy. If further, it is in the interest of private sector, but not public sector, employers to discriminate in favour of men in their wages (perhaps because of closer and more effective monitoring of sex differentials in incomes in the state), this might help account for how it is that gender earnings discrimination is more severe in the private sectors than in the state sector. At the same time, however plausible this interpretation may seem to be, it qualifies as no more than that--a plausible interpretation. Much more research and better theory will be required before we can be confident that we understand the origins of gender wage discrimination.

Some Social Policy Implications

To the social scientist, such substantial differences in earnings between the sexes as have been documented in this research demand explanation. To the public and politicians, they demand remedial action to the extent that they are perceived as inequitable and, therefore, as a social problem. While it would be an exaggeration to say that gender earnings

inequalities are seen to be a major social problem by the majority of Canadians, they are seen as such by many, and a number of policy initiatives have been undertaken by provincial governments, along with the federal government, in regard to them. But are they appropriately viewed as a social problem and, if so, what might best be done about them? While these are ultimately political, as opposed to scientific, questions, there are enlightened and unenlightened answers which can be given to them, and it is the responsibility of those who study such things to consider the policy implications of their findings and make them known.

Social problems are phenomena arising out of the structure and organization of society which are defined as undesirable. The first question which must be addressed, then, is whether gender earnings inequalities are at least to some extent social in their origins. The answer which can be given on the basis of this research is quite unequivocal: they are definitely to some degree socially caused. Specifically, men and women tend not to be remunerated in the same way for the same qualities which they bring to their jobs, and this operates to the advantage of men and the disadvantage of women. At the same time, the differences between men and women in this regard are not uniform across Canadian society, but rather vary systematically from one economic sector to another. The second question, then, becomes one of what some of the policy implications of these findings might be.

The principal finding of this dissertation is that the differences between men and women in their earnings originate importantly in the differences between them in their returns to earnings-related characteristics. Moreover, these differences tend to be greater in privately-owned than in

publicly-owned enterprises. What seems quite clearly to be involved here, then, is gender earnings discrimination, and this suggests that employers are proper targets for remedial action. That is, men and women are not being remunerated in the same way for the same qualities, and it is employers who are directly or indirectly making decisions which have this effect. Efforts at reducing gender earnings inequalities which are aimed at changing the behaviours of employers, such as "equal pay for equal work" laws or legislation which prohibits discrimination on the basis of sex, then, would be at least oriented in the right direction. In addition, since the phenomena of gender earnings discrimination are more pronounced in the private than in the public sectors of the economy, policies which deny government contracts to business firms which cannot produce good evidence of nondiscriminatory employee treatment would also be appropriate to consider.

Another finding of this research is that differences between men and women in the average levels of their earnings-related attributes are not an important source of the differences between them in their earnings. Consequently,efforts aimed at raising women up to the levels of men in their stores of human capital, occupational status, or other earnings-related characteristics do not seem particularly promising. In general, it is not that women are wanting in this regard relative to men, but that they are not paid the same returns as men are for the same attributes that men have. In some respects, this may seem surprising, since the evidence of occupational sex segregation in Canada is overwhelming, for example, and we know that proportionally more men than women receive university degrees. What this largely means, though, is that different

occupational and educational distributions for men and women have no very profound implications for male and female incomes, since they yield "averages" which are about the same. Men are over-represented at both the top and the bottom ends of the scale of occupational status and the continuum of educational attainment relative to women, and it is not unreasonable to think of these inequalities as social problems which a government might address. They do not, however, figure importantly in overall male-female earnings inequalities.

Finally, one possible source of the male-female earnings gap which has been pointed to recently is the very institution of marriage itself. In a vigorous attack on affirmative action initiatives undertaken by governments, and a spirited defence of the mechanism of free market competition as the most effective guarantor of equal opportunity, Block and Walker (1982) argue that the institution of marriage helps men and hinders women economically, making it appear as if there is employer discrimination where there is not. Although Block, Walker and the other contributors to their edited volume stop far short of suggesting that this is evidence of any problems in the family, many feminists and others agree with this premise, while taking it to the conclusion that better day-care facilities and improved maternity benefits are required. The findings of this research, however, show marital status as such to be an inconsequential determinant of earnings for employed women, although married and separated (but not divorced or widowed) men who are employed do earn more than never-married men. With regard to employed men and women, then, policies directed at alleviating the burdens of pregnancy and motherhood do not seem likely to have much influence on men's and women's earnings.

Of course, such policies probably do have far-reaching implications for the earnings of women who never enter or who drop out of the labour force for reasons related to having and caring for children. This is, however, a set of related problems which could not be considered here.

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APPENDIX A

JOB MOBILITY SURVEY

Statistics Canada Statistique Canada

Form JM-1

Labour Force Survey Division

JOB MOBILITY SURVEY

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Authority—Statistics Act, Chapter 15, Statutes of Canada 1970-71-72

Name (surname)	(Given names)	This questionnaire will be picked up by your interviewer on

1-5 PSU | 6-8 Segment | 9-12 Listing | 13-14 Line | 15 M / F | 16-17 A

Answers to most of the questions in this survey require only a check mark ☑ in the appropriate box. Answers which require a number should be written in the boxes provided. Please remember to write zero where appropriate. If you should have any difficulties with a question note this in the space on the back of the form, and ask your Statistics Canada interviewer for assistance when she returns.

You will find that a number of questions ask about jobs that you or your father have had during your lifetime. In this survey a "Job" is defined as "Working for pay or profit". As a reminder, this expression has been included in brackets after the word "Job" in some questions.

1. In what year were you born? ..... 18-20 (year)

2. Where were you born? (Check one only, according to present boundaries.)

Newfoundland	00	Portugal	17
Prince Edward Island	01	France	18
Nova Scotia	02	Greece	19
New Brunswick	03	Other Western Europe (e.g. Spain, Belgium, Scandanavia, Finland, Austria, etc.)	20
Quebec	04		
Ontario	05	Poland	21
Manitoba	06	Ukraine	22
Saskatchewan	07	Other Eastern Europe (e.g. U.S.S.R., Hungary, Balkan States, etc.)	23
Alberta	08		
British Columbia	09	Middle East or Asia Minor (e.g. Lebanon, Turkey, Israel, etc.)	24
Yukon	10	British West Indies	25
North West Terr.	11	China or Japan	26
United Kingdom	12	Other	27
United States of America	13		
Italy	14		
Germany	15		
Netherlands	16		

If you were not born in Canada, answer the following question; otherwise go to question 4. In what year did you last take up residence in Canada? (Do not consider as a break in residence time spent studying abroad, or short visits outside of Canada, e.g. away 6 months or less.) ..... 23-24 (year)

4. What is the highest level of education that you have completed? (If you were not educated in this country check the category which best describes your educational attainment.) (Check only one in the entire list.)

No formal schooling 00

Go to question 6

Elementary school
- Some 01
- Completed 02

High school

Academic
- Some 03
- Completed 04

Vocational or technical
- Some 05
- Completed 06

After high school but not university

Business or trades training (e.g. secretarial school, hairdressing school, barbering school, trade school, etc.)
- Some 07
- Completed 08

Nursing school or Teacher's College
- Some 09
- Completed 10

Community College, Junior College, CEGEP, Technical Institute
- Some 11
- Completed 12

University
- Some 13

Completed:
- Certificate or diploma 14
- Bachelor's degree 15
- Master's degree 16
- Doctorate 17
- Professional degree (e.g. M.D., L.L.B., C.A., etc.) 18

5. How many years altogether were you in school? ..... 27-28 (years)

6. Aside from regular school, did you ever complete an apprenticeship, a full-time program in a company training school lasting six weeks or more, or training in the Canadian Armed Forces leading to qualification in a trade? ..... Yes 0 No 1

7. If you have ever served in the Canadian Armed Forces, answer the following question; otherwise go to question 8. What was your longest period of continuous service? (Do not count service in the cadet, militia, or reserve units.)

From 30-31 (year) to 32-33 (year)

NOW WE WOULD LIKE TO ASK YOU SOME QUESTIONS ABOUT JOBS WHICH YOU HAVE HAD STARTING WITH YOUR FIRST JOB

8. Describe your first full-time job (for pay or profit) after completing your education as indicated above in question 4. (If you never had a full-time job after completion of your education go to question 20.)

(i) What kind of work were you doing? (Give a full description, e.g. selling shoes, motor vehicle repairing, metal machining, clerical work, secretarial work)

(ii) What were your most important activities or duties? (e.g. fitting shoes, auto body work, operating lathe, posting invoices, taking dictation and typing)

(iii) What was your job title? (e.g. manager of shoe department, auto body repairman, lathe operator, invoice clerk, secretary-stenographer)

(iv) In what kind of business, industry or service was this job? (e.g. retail shoe store, auto body repair shop, machine parts mfg., medical clinic)

34 - 37

For office use only

(v) If, in this job, you owned a business or farm, or if you were a manager or supervisor, answer the following question; otherwise go to question 8 (vi). How many personnel did you usually employ or have working under you?

None ..... ☐ 0
1 - 5 ..... ☐ 1
6 - 10 ..... ☐ 2
11 - 20 ..... ☐ 3
21 - 74 ..... ☐ 4
75 or more ..... ☐ 5

39 - 40

(vi) In what year did you begin working at this job? ..... 1 (year)

9. Did you use English or French on your first full-time job? (Check one only)

English but not French ..... ☐ 0
French but not English ..... ☐ 1
Both English and French ..... ☐ 2
Neither English nor French ..... ☐ 3

10. From the beginning of your first full-time job until now, in how many years have you worked full-time for pay or profit? (Count as a full year any in which you worked for a period of seven months or more.) ..... 42 - 43 (years)

11. Since you began your first full-time job, was there a single period of one year or more when you were not working for pay or profit?

No ..... ☐ 0 ⟶ Go to question 16
Yes ..... ☐ 1 ⟶ Go to question 12

45 - 46

12. In what year did this period begin? (First period if more than one.) ..... (year)

13. At any time after that, did you return to a full-time job (for pay or profit) for a single period of 7 months or more?

No ..... ☐ 0 ⟶ Go to question 19
Yes ..... ☐ 1 ⟶ Go to question 14

48 - 49

14. In what year did you return? (Most recent if more than once.) ..... 1 (year)

15. In the space provided below describe the job to which you returned. (Most recent if more than one.)

(i) What kind of work were you doing? (Give a full description, e.g. selling shoes, motor vehicle repairing, metal machining, clerical work, secretarial work)

(ii) What were your most important activities or duties? (e.g. fitting shoes, auto body work, operating lathe, posting invoices, taking dictation and typing)

(iii) What was your job title? (e.g. manager of shoe department, auto body repairman, lathe operator, invoice clerk, secretary-stenographer)

(iv) In what kind of business, industry or service was this job? (e.g. retail shoe store, auto body repair shop, machine parts mfg., medical clinic)

50 - 53

For office use only

(v) If, in this job, you owned a business or farm, or were a manager or supervisor, answer the following question; otherwise go to question 17. How many personnel did you employ or have working under you?

None ..... ☐ 0
1 - 5 ..... ☐ 1
6 - 10 ..... ☐ 2
11 - 20 ..... ☐ 3
21 - 74 ..... ☐ 4
75 or more ..... ☐ 5

GO TO QUESTION 17

16. In the space provided below describe the job (for pay or profit) which you held ten years ago, i.e., in July 1963. (If you were not working at that time describe the last job which lasted 7 months or more which you had prior to July 1963. If you did not have one go to question 17.)

(i) What kind of work were you doing? (Give a full description, e.g. selling shoes, motor vehicle repairing, metal machining, clerical work, secretarial work)

(ii) What were your most important activities or duties? (e.g. fitting shoes, auto body work, operating lathe, posting invoices, taking dictation and typing)

(iii) What was your job title? (e.g. manager of shoe department, auto body repairman, lathe operator, invoice clerk, secretary-stenographer)

(iv) In what kind of business, industry or service was this job? e.g. retail shoe store, auto body repair shop, machine parts mfg., medical clinic)

55 - 58

For office use only

(v) If, in this job, you owned a business or farm, or were a manager or supervisor, answer the following question; otherwise go to question 17. How many personnel did you employ or have working under you?

None ..... ☐ 0
1 - 5 ..... ☐ 1
6 - 10 ..... ☐ 2
11 - 20 ..... ☐ 3
21 - 74 ..... ☐ 4

17. Describe your present job (for pay or profit) – main job if more than one. If you are not working now, or if you are retired, answer for your last job which lasted 7 months or more.

(i) What kind of work are (were) you doing? (e.g. selling shoes, motor vehicle repairing, metal machining, clerical work, secretarial work)

(ii) What are (were) your most important activities or duties? (e.g. fitting shoes, auto body work, operating lathe, posting invoices, taking dictation and typing)

(iii) What is (was) your job title? (e.g. manager of shoe department, auto body repairman, lathe operator, invoice clerk, secretary-stenographer)

(iv) In what kind of business, industry or service is (was) this job? (e.g. retail shoe store, auto body repair shop, machine parts mfg., medical clinic)

For office use only — 60 - 63

(v) If, in this job, you own (owned) a business or farm, or are (were) a manager or supervisor, answer the following question; otherwise go to question 17 (vii). How many personnel do (did) you employ or have working under you?

- None ☐ 0
- 1 - 5 ☐ 1
- 6 - 10 ☐ 2
- 11 - 20 ☐ 3
- 21 - 74 ☐ 4
- 75 or more ☐ 5

(vi) In this job are (were) you working: (Check one only)

- (a) For others for wages, salary or commission? ☐ 0
- (b) In your own business, farm or professional practice that is:
  - (i) incorporated? ☐ 1
  - (ii) unincorporated? ☐ 2

(vii) If you are now retired or not working, answer the following question: otherwise go to 17 (viii). In what year did you leave the job described above? 1 ☐☐☐ (year) — 66 - 67

(viii) Are (were) you working at this job:

- Usually 35 hours or more per week? ☐ 0
- Usually less than 35 hours per week? ☐ 1

18. Do (did) you use English or French on the job indicated in question 17? (Check one only)

- English but not French ☐ 0
- French but not English ☐ 1
- Both English and French ☐ 2
- Neither English nor French ☐ 3

19. From the beginning of your first full-time job (for pay or profit) to the present, how many periods of more than 3 months were you not working for pay or profit?

- None ☐ 0
- One period ☐ 1
- Two periods ☐ 2
- Three periods ☐ 3
- Four periods ☐ 4
- Five to ten periods ☐ 5
- Eleven to twenty periods ☐ 6
- Twenty-one or more periods ☐ 7

NOW WE WOULD LIKE TO ASK YOU SOME FURTHER QUESTIONS ABOUT YOURSELF, YOUR FAMILY AND YOUR PARENTS

20. What is your present marital status?

- Single (never married) ☐ 0 → Go to question 27
- Married ☐ 1
- Separated ☐ 2
- Divorced ☐ 3
- Widowed ☐ 4

21. In what year were you married? (If you were married more than once, give the year of your first marriage.) 1 ☐☐☐ (year) — 72 - 73

22. How many children have you had (count all live births)?

- 0 ☐ 0 → Go to question 27
- 1 ☐ 1
- 2 ☐ 2
- 3 ☐ 3
- 4 ☐ 4
- 5 ☐ 5
- 6 ☐ 6
- 7 ☐ 7
- 8 or more ☐ 8

23. How many of these children are now living with you?

- 0 ☐ 0
- 1 ☐ 1
- 2 ☐ 2
- 3 ☐ 3
- 4 ☐ 4
- 5 ☐ 5
- 6 ☐ 6
- 7 or more ☐ 7

MALES GO TO QUESTION 27

24. In what year was your youngest child born? 1 ☐☐☐ (year) — 76 - 77

25. After your first child was born, but before your last child (if more than one) began school, did you have a job (for pay or profit) for at least one period of 7 months or more?

- Yes, full-time (usually 35 hours or more per week) ☐ 0
- Yes, part-time (usually less than 35 hours per week) ☐ 1

26. After your youngest child began school, did you have a job (for pay or profit) for at least one period of 7 months or more?

- Yes, full-time (usually 35 hours or more per week) ☐ 0
- Yes, part-time (usually less than 35 hours per week) ☐ 1
- No, I did not have a job ☐ 2
- No, my children are not yet of school age ☐ 3

27. How many brothers do you have? (Count step and half-brothers and those no longer living.)

- 0 ☐ 0
- 1 ☐ 1
- 2 ☐ 2
- 3 ☐ 3
- 4 ☐ 4
- 5 ☐ 5
- 6 ☐ 6
- 7 or more ☐ 7

28. How many of your brothers are older than you? (Count step and half-brothers and those no longer living.)

- 0 ☐ 0
- 1 ☐ 1
- 2 ☐ 2
- 3 ☐ 3
- 4 ☐ 4
- 5 ☐ 5
- 6 ☐ 6
- 7 or more ☐ 7

29. How many sisters do you have? (Count step and half-sisters and those no longer living.)

- 0 ☐ 0
- 1 ☐ 1
- 2 ☐ 2
- 3 ☐ 3
- 4 ☐ 4
- 5 ☐ 5
- 6 ☐ 6
- 7 or more ☐ 7

30. How many of your sisters are older than you? (Count step and half-sisters and those no longer living.)

- 0 ☐ 0
- 1 ☐ 1
- 2 ☐ 2
- 3 ☐ 3
- 4 ☐ 4
- 5 ☐ 5
- 6 ☐ 6
- 7 or more ☐ 7

31. When you were 16 years old where were you living: (Check one only)

- In the same city, town, village or municipality as you are now? ☐ 0
- In a different city, town, village or municipality of population: (check according to the size when you were 16, not present size)
  - 100,000 or more? ☐ 1
  - 20,000 to 99,999? ☐ 2
  - 5,000 to 19,999? ☐ 3
  - 1,000 to 4,999? ☐ 4
  - Less than 1,000: On a farm? ☐ 5
  - Not on a farm? ☐ 6

32. Where was that?

- Newfoundland ☐ 00
- Prince Edward Island ☐ 01
- Nova Scotia ☐ 02
- New Brunswick ☐ 03
- Quebec ☐ 04
- Ontario ☐ 05
- Manitoba ☐ 06
- Saskatchewan ☐ 07
- Alberta ☐ 08
- British Columbia ☐ 09
- Yukon or North West Terr. ☐ 10
- Outside of Canada ☐ 11

33. Since you became 16 years of age, how many times have you moved (changed your place of permanent residence) from one city, town, village or municipality to another? (Count moves inside and outside of Canada.)

- Never moved ☐ 0 → Go to question 35
- One time ☐ 1
- Two times ☐ 2
- Three times ☐ 3
- Four times ☐ 4
- Five times ☐ 5
- Six to ten times ☐ 6
- Eleven to twenty times ☐ 7
- Twenty-one or more times ☐ 8

34. Since you became 16 years of age, how many times have you moved (changed your place of permanent residence) in Canada (present boundaries) from one province to another? (Count moves involving the Yukon or North West Territories as inter-provincial moves.)

- None ☐ 0
- One time ☐ 1
- Two times ☐ 2
- Three times ☐ 3
- Four times ☐ 4
- Five times ☐ 5
- Six to ten times ☐ 6
- Eleven to twenty times ☐ 7
- Twenty-one or more times ☐ 8

35. Where were your parents born? (Check one for each parent.)

	Father	Mother
Atlantic Provinces (Nfld., N.S., N.B., P.E.I.)	☐ 0	☐ 0
Quebec	☐ 1	☐ 1
Ontario	☐ 2	☐ 2
Prairie Provinces (Man., Sask., Alta., N.W.T.)	☐ 3	☐ 3
British Columbia (and Yukon)	☐ 4	☐ 4
United Kingdom	☐ 5	☐ 5
Western Europe (France, Germany, Neth., Italy, Scandanavia, etc.)	☐ 6	☐ 6
Eastern Europe (Poland, Ukraine, etc.)	☐ 7	☐ 7
Other	☐ 8	☐ 8
Don't know	☐ 9	☐ 9

36. Did your father immigrate to Canada? (If yes, indicate the period in which he immigrated.)

- No ☐ 0
- Yes: Before 1911 ☐ 1
- 1911 - 1920 ☐ 2
- 1921 - 1930 ☐ 3
- 1931 - 1940 ☐ 4
- 1941 - 1950 ☐ 5
- 1951 - 1960 ☐ 6
- 1961 - 1970 ☐ 7
- 1971 - 1973 ☐ 8

37. (a) When you were 16 years old were you living with both your parents?

Yes ..... ☐ 0 → Go to question 38

No ..... ☐ 1 → Go to question 37 (b)

(b) Who was the head of your family when you were 16 years of age? If you had left home by that age, indicate the person who was head of your family at the time you left. (Check one only)

Father ..... ☐ 0

Mother ..... ☐ 1

Other male ..... ☐ 2

Other female ..... ☐ 3

38. Now we would like to find out what kind of work your father did when you were about 16 years old. If your father was not the head of your household at that time answer for the person checked in question 37 (b). (If you do not know the answer to a particular question indicate this rather than leave it unanswered.)

(i) What kind of work was he doing? (Give a full description, e.g. selling shoes, motor vehicle repairing, metal machining, clerical work, secretarial work)

(ii) What were his most important activities or duties? (e.g. fitting shoes, auto body work, operating lathe, posting invoices, taking dictation and typing)

(iii) In what kind of business, industry or service was this job? (e.g. retail shoe store, auto body repair shop, machine parts mfg., medical clinic)

94 - 97

For office use only

(iv) If he owned a farm to do this work, how many people did he usually employ?

Did not own a farm ..... ☐ 0

None ..... ☐ 1

1 - 10 ..... ☐ 2

11 - 20 ..... ☐ 3

21 - 74 ..... ☐ 4

75 or more ..... ☐ 5

Don't know ..... ☐ 6

(v) In this job was he working:

(a) For others for wages, salary or commission? ..... ☐ 0

(b) In his own business, farm, or professional practice that is:

(i) incorporated? ..... ☐ 1

(ii) unincorporated? ..... ☐ 2

(c) Don't know ..... ☐ 3

39. What was your parents' highest level of education? (If your parents were not educated in Canada check the category which best describes their educational attainment.) (Check one only for each parent.)

	Father	Mother
No formal schooling	☐ 00	☐ 00
Elementary school		
Some	☐ 01	☐ 01
Completed	☐ 02	☐ 02
High school		
Academic		
Some	☐ 03	☐ 03
Completed	☐ 04	☐ 04
Vocational or technical		
Some	☐ 05	☐ 05
Completed	☐ 06	☐ 06
After high school but not university		
Business or trades training: (e.g. secretarial school, hairdressing school, barbering school, trade school, etc.)		
Some	☐ 07	☐ 07
Completed	☐ 08	☐ 08
Nursing school or Teacher's college		
Some	☐ 09	☐ 09
Completed	☐ 10	☐ 10
Junior college, College classique, Technical Institute		
Some	☐ 11	☐ 11
Completed	☐ 12	☐ 12
University		
Some	☐ 13	☐ 13
Completed:		
Certificate or diploma	☐ 14	☐ 14
Bachelor's degree	☐ 15	☐ 15
Master's degree	☐ 16	☐ 16
Doctorate	☐ 17	☐ 17
Professional degree (e.g. M.D., L.L.B., C.A., etc.)	☐ 18	☐ 18

40. Did your mother work at a full-time job (for pay or profit) at any time during your primary and secondary schooling?

No ..... ☐ 0

Go to question 42

Yes, she worked less than a year ..... ☐ 1

Yes, she worked for 1 - 5 years ..... ☐ 2

Yes, she worked for 6 - 10 years ..... ☐ 3

Yes, she worked for more than 10 years ..... ☐ 4

Don't know ..... ☐ 5

41. During your primary and secondary education what type of job (for pay or profit) did your mother mainly have? (Check one only)

Professional, managerial, technical (e.g. teacher, nurse, dietitian, department manager, radiologist) ..... ☐ 0

Secretarial or clerical (e.g. stenographer, telephone operator) ..... ☐ 1

Sales (e.g. saleslady, model) ..... ☐ 2

Service (e.g. waitress, hairdresser, baby sitter, nurses aide) ..... ☐ 3

Skilled or semi-skilled industrial worker ..... ☐ 4

Working on her own account out of her home (e.g. dressmaker, cleaning lady) ..... ☐ 5

Farming ..... ☐ 6

42. To what ethnic or cultural group did you or your ancestor (on the male side) belong on coming to this continent? (Check one only)

English	00
French	01
German	02
Irish	03
Italian	04
Jewish	05
Native Indian or Eskimo	06
Netherlands	07
Norwegian	08
Polish	09
Russian	10
Scottish	11
Ukrainian	12
Other	13
Don't know	14

43. To which ethnic or cultural group do you feel that you now belong? (Check one only)

American	00
Canadian	01
Danish	02
English	03
French	04
German	05
Hungarian	06
Irish	07
Italian	08
Jewish	09
Native Indian or Eskimo	10
Netherlands	11
Norwegian	12
Polish	13
Russian	14
Scottish	15
Swedish	16
Ukrainian	17
Welsh	18
Other	19

44. What is your religion?

Anglican	0
United Church of Canada	1
Presbyterian	2
Lutheran	3
Dutch Reform	3
Roman Catholic	4
Ukrainian Catholic	5
Greek Orthodox	5
Jewish	6
Baptist	7
7th Day Adventist	7
Methodist	7
Other Protestant	7
Other	8
No religion	9

45. What is the language which you first learned to speak?

English	0
French	1
German	2
Italian	3
Ukrainian	4
Indian or Eskimo	5
Netherlands	6
Polish	7
Other	8

46. What is the language in which you feel most comfortable while talking?

English	0
French	1
German	2
Italian	3
Ukrainian	4
Indian or Eskimo	5
Netherlands	6
Polish	7
Other	8

47. Can you speak English or French well enough to carry on a conversation?

English only	0
French only	1
English and French	2
Neither English nor French	3

48. In how many weeks did you have a job (for pay or profit) during 1972?

None	0

Go to question 51

1-13 weeks	1
14-26 weeks	2
27-39 weeks	3
40-48 weeks	4
49-52 weeks	5

49. How many hours per week did you usually work during 1972?

35 hours or more	0
20-34 hours	1
Less than 20 hours	2

50. What was your income (before taxes) from employment during 1972? (Include wages, salaries, tips, commissions, etc. or if you have your own farm, business or professional practice give your net income after deducting business expenses but before taxes.) (Check one only)

No income	00
Less than $2,000	01
$ 2,000 - 2,999	02
$ 3,000 - 3,999	03
$ 4,000 - 4,999	04
$ 5,000 - 5,999	05
$ 6,000 - 6,999	06
$ 7,000 - 7,999	07
$ 8,000 - 8,999	08
$ 9,000 - 9,999	09
$10,000 - 10,999	10
$11,000 - 11,999	11
$12,000 - 12,999	12
$13,000 - 13,999	13
$14,000 - 14,999	14
$15,000 - 15,999	15
$16,000 - 16,999	16
$17,000 - 19,999	17
$20,000 and over	18
Net loss	19

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51. During 1972, what was your total personal income (before taxes) from all sources (include interest, dividends, rents received, pensions, youth allowances, welfare, etc.)? If you own a farm or are self-employed, state the amount after the deduction of business expenses.

No income	☐ 00
Less than $2,000	☐ 01
$ 2,000 - 2,999	☐ 02
$ 3,000 - 3,999	☐ 03
$ 4,000 - 4,999	☐ 04
$ 5,000 - 5,999	☐ 05
$ 6,000 - 6,999	☐ 06
$ 7,000 - 7,999	☐ 07
$ 8,000 - 8,999	☐ 08
$ 9,000 - 9,999	☐ 09
$10,000 - 10,999	☐ 10
$11,000 - 11,999	☐ 11
$12,000 - 12,999	☐ 12
$13,000 - 13,999	☐ 13
$14,000 - 14,999	☐ 14
$15,000 - 15,999	☐ 15
$16,000 - 16,999	☐ 16
$17,000 - 19,999	☐ 17
$20,000 and over	☐ 18
Net loss	☐ 19

THANK YOU FOR YOUR ASSISTANCE

Comments:

APPENDIX B

SUBSTITUTION OF MISSING VALUES

APPENDIX B

SUBSTITUTION OF MISSING VALUES

Variable	Missing Value	Substitution	
		Males	Females
Age (NVAR029)	blank	39*	36*
Age squared (AGESQ)	blank	1702	1498
Education (VAR032)	blank	11*	12*
Experience (VAR042)	blank	Age-education + 6 (if experience = never worked full time, experience = 0)	
Experience squared (VAR042sq)	blank	$VAR042^2$	
Hours worked per week** (VAR095)	0,6	45*	42*
Weeks worked per year**	0	39*	36*
Present occupation	blank	see Chapter 4	see Chapter 4
First occupation	blank	Present Occupation	Present Occupation

* These are mean values

** Not in the analysis if var096 = 0 and var095 = 0 or 6

APPENDIX C

RECODING INSTRUCTIONS FOR THREE-DIGIT S.I.C.

June 18, 1979.

Mr. Frank Gallagher
Special Surveys
Jean Talon Building
3rd Floor, Section C
Tunney's Pasture
Ottawa, Ontario

Dear Mr. Gallagher:

Dr. P. C. Pineo and I have recently been awarded a small grant by the Department of Labour to fund my dissertation research entitled, "Sector Effects on Earnings Determination." The data for this study will largely come from the July 1973 Labour Force and Job Mobility studies. The purpose of this grant is to allow the purchase from Statistics Canada of a recoding of a small number of variables on the Labour Force Study and the release of a new limited variable tape of data from both the Labour Force and the Job Mobility studies. You will recall that in a letter dated May 23, 1978 Dr. Pineo requested information on the possible cost and the feasibility of a recoding on industry of occupation on the LFS (see request 1) and you responded (June 2, 1978) with a request for more information. This letter is a more detailed request for a cost estimate of the work to be done by Statistics Canada and for a date by which this work could be completed.

Enclosed are specifications of the work required. While detailed directions can be sent to you at a later date, this constitutes a full description of the nature of the work required. I would like to assure you that every precaution is being taken on our part to ensure that the alternate collapse of the variables satisfy your concern with the issue of confidentiality. I am attempting to construct the new codes so that sufficient numbers of individuals fall into each category. And, to this end, I am also requesting the release of a limited variable tape which omits the variables that are not needed for the analysis of the data. In addition, you may also consider changing the identification numbers of the new data tape so as to limit comparability across data tapes.

If you require more information, please phone me at home (519-623-6694) or at McMaster (ext 2021) up to July 8th and after July 28th. While I am on vacation, Dr. Pineo will be happy to supply any additional information that you may require. And, too, there are limited funds to allow me to travel to Ottawa to facilitate, in any way that I can, the work to be carried out by Statistics Canada.

I await your reply.

Sincerely,
(Ms.) Margaret A. Denton

DETAILED SPECIFICATIONS OF THE WORK REQUIRED FROM STATISTICS CANADA

1. A Recoding of Three Variables on the July, 1973 Labour Force Survey

1 LFS Industry Codes, SIC 1970, Question 17, position 29-30.

Industry of occupation was originally coded into three-digit SIC codes for the Labour Force Study. I would like an alternate recoding of the three-digit SIC codes into 18 categories. Directions for collapsing this data will be sent to you and follow this general format.

SIC,1970	New Code
001	1
002	1
.	.
.	.
.	.
039	2
etc.	

2 Primary Sampling Units

I would like a regrouping of the primary sampling units into 7 or 8 categories based on their delineating economic activity. Again, directions for recoding will be sent to you and will follow the above format.

3 Subprovincial areas, position 11.

If possible, I would like a regrouping of subprovincial areas to six categories rather than five, as currently coded.

2. Variables that would be deleted from the new data tape

1 From the Labour Force Survey

Position on the Micro Data Tape	Name of Variable
13	Marital Status
14	Labour Force Status
15-16	Age - Group A
17-18	Age - Group B
19-20	Hours Worked During the Reference Week
21	Duration of Unemployment as of the Reference Week
22	Looking for Full-time Work
23	Full-time and Part-time Worker
24	Reasons of Absence
25-26	The 1961 Occupational Classification
31	Class of Worker, Group A
32	Class of Worker, Group B
33-39	Final Universal Weights - Labour Force Survey

2 From the Job Mobility Study

Question Number	Name of Variable
Q7	Year Entered Armed Services of Canada
Q7	Year Left Armed Services of Canada
Q8v	For Managers: Number of Personnel
Q9	Language Spoken on First Full-time Job
Q13	Did you return to work for a period of 7 months or more
Q14	Year that you returned to work for a period of 7 months or more
Q15v	For Manager: Number of Personnel
Q16iv	(Blishen) Occupation Code for the job held ten years ago
Q16iv	(Pineo-Porter) Occupation Code for the job held ten years ago
Q16v	For Managers: Number of Personnel
Q32	Province or Country of Residence at Age 16
Q33	Number of Moves Between Cities Since Age 16
Q34	Number of Moves Between Provinces Since Age 16
Q35	Place of Father's Birth
Q35	Place of Mother's Birth
Q36	Period Father Immigrated to Canada (if born Elsewhere than Canada)
Q37(a)	Living with both Parents at Age 16
Q38iv	If Father was a Farmer - Number of people he employed
Q38v	Father's Class of Worker Status when Respondent was Age 16
Q43	Respondent's Ethnic or Cultural Group
Q45	Language First Spoken by Respondent
Q51	Total Personal Income from all Sources in 1972

I am aware that the occupation question ("present job") in the JMS is significantly different from the solicited occupation question (job for reference week) in the LFS. Since I plan to use the industry or occupation from the LFS, it would be desirable to have some measure of the overlap between "present job" and job during the reference week. I would like Statistics Canada, therefore, to create a new variable which would answer the question: Does the 1st two digits of the C.C.D.O. code from the LFS equal the 1st two digits of the C.C.D.O. code for present job on the JMS?

Yes = 1
No = 2

The work required from Statistics Canada is despite this lengthy request, rather simplistic, requiring, in essence, a single pass of the micro data tape and the original (raw) data tape through the computer. During this run, the recoding of industry from the three-digit SIC, the collapsing of the primary sampling units into eight categories, the recoding of subprovincial areas and the creation of the new occupation check variable would be done. In addition, the variables not required for my analysis could be deleted from the micro data tape. From this run, a new and sharply reduced data tape would be produced.

In order to be able to run this new data tape at McMaster, the tape must be set up according to certain specifications. I have obtained these from the computer center and will enclose them for your information.

McMASTER TAPE SPECIFICATIONS

Density - 9-track 1600 or 800 bp
or 7-track 556 or 800 bp

All data must be characters - no packed, binary, etc.

8-Bit ASCII or EBCDIC code (6-bit BCD for 7-track)

Fixed-length blocks and records (FB format)

Block length - 5120 characters preferred.

Unlabeled tape only. If more than one file, separate by one tape mark after each.

Covering letter (not computer printout) specifying all above choices, plus record and block lengths and number of records for each file.

(a)

APPENDIX C

RECODING INSTRUCTIONS FOR INDUSTRY, S.I.C. 1970 (REFERENCE WEEK) COLLECTED JULY 1973 LABOUR FORCE SURVEY

Industry Number (S.I.C.)	New Code	Industry Number (S.I.C.)	New Code	Industry Number (S.I.C.)	New Code
001	011	106	061	259	041
003	011	107	052	261	062
011	011	108	042	264	042
013	011	109	042	266	062
015	011	151	031	268	054
017	011	153	033	271	054
019	011	162	043	272	034
021	011	165	061	273	043
031	012	172	033	274	052
039	012	174	062	286	062
041	011	175	042	287	061
045	011	179	052	288	051
047	011	181	031	289	043
051	024	182	052	291	033
052	022	183	042	292	033
057	023	184	032	294	043
058	024	185	031	295	032
059	023	186	044	296	032
061	024	187	041	297	033
064	022	188	031	298	042
071	023	189	054	301	043
072	022	231	051	302	053
073	021	239	061	303	062
079	023	243	063	304	053
083	022	244	063	305	054
087	022	245	061	306	062
096	021	246	064	307	062
098	021	248	042	308	061
099	021	249	042	309	063
101	043	251	063	311	044
102	052	252	042	315	062
103	052	254	062	316	044
104	052	256	051	318	031
105	032	258	042	321	033

Appendix C (continued)

Industry Number (S.I.C.)	New Code	Industry Number (S.I.C.)	New Code	Industry Number (S.I.C.)	New Code
311	044	392	053	617	101
315	062	393	042	618	101
316	044	397	063	619	101
318	031	399	041	621	101
321	033	404	073	622	101
323	034	406	071	623	101
324	043	409	071	624	101
325	044	421	073	625	101
326	034	501	083	626	101
327	034	502	084	627	101
328	061	503	084	629	101
329	032	504	093	631	112
331	043	505	094	642	111
332	034	506	091	652	111
333	051	507	092	654	111
334	032	508	094	656	111
335	042	509	083	658	111
336	043	512	091	663	111
338	034	515	091	665	111
339	042	516	081	667	111
351	043	517	091	669	111
352	034	519	091	673	111
353	061	524	092	676	111
354	042	527	093	678	111
355	052	543	093	681	111
356	033	544	083	691	111
357	034	545	082	692	111
358	033	548	084	694	111
359	033	572	083	695	111
365	032	574	093	696	112
369	041	576	081	697	111
372	032	579	081	699	111
373	042	602	101	701	121
374	052	606	101	703	121
375	052	608	101	705	121
376	031	611	101	707	121
377	041	612	101	715	121
378	043	614	101	721	121
379	051	615	101	735	121
391	042	616	101	737	121

Appendix C (continued)

Industry Number (S.I.C.)	New Code
801	131
802	133
803	131
804	131
805	131
806	131
807	131
809	133
821	132
822	132
823	141
824	141
825	141
826	141
827	133
828	131
831	141
841	141
842	141
843	141
844	141
845	141
849	141
851	141
853	141
855	141
861	141
862	141
863	141
864	141
866	141
867	141
869	141
871	141
872	141
873	141
874	141
876	141
877	141
879	141
881	141
883	141
884	141
886	141
891	141
893	141
894	141
895	141
896	141
897	141
898	141
899	141
902	151
909	153
931	154
951	153
991	153
000	999 missing
never worked	169
not in the labour force	179

(b)

A comparison of the two digit C.C.D.O. codes of the job held during the reference week (from the July L.F.S.) and the present job (from the job mobility questionnaire)

Same	= 1
Different	= 2
L.F.S. missing	= 3
J.M.S. missing	= 4
Never worked	= 5
Not in the labour force	= 6

APPENDIX D

VARIABLE LABEL	VARIABLE NAME
PPCAT4	Status of Current Occupation
VAR095	Weeks Worked per Year
VAR096	Hours Worked per Week
PPCAT1	Status of First Occupation
PPCAT5	Status of Father's Occupation
NVAR032	Years of Education
VAR042	Years in Labour Force
SQVAR042	Years in Labour Force Squared
NVAR029	Years of Age
AGESQ	Years of Age Squared
CAREER INTERRUPTIONS	
EXPER1	No Interruptions
EXPER2	Returned 10 years ago
EXPER3	Returned 5-10 years ago
EXPER4	Returned 2-5 years ago
EXPER5	Returned 0-2 years ago
EXPER6	Never Returned Full-time
EXPER7	Never Worked Full-time
EXPER0	Career Interruptions Missing
UNIONIZATION LEVEL	
VAR1021	Low Unionization
VAR1022	Medium Low Unionization
VAR1023	Medium High Unionization
VAR1024	High Unionization
VAR1029	Unionization Missing
MARITAL STATUS	
VAR061SI	Single
VAR061M	Married
VAR061SE	Separated
VAR061D	Divorced
VAR061W	Widowed
VAR061NA	Missing
SECTORS	
CORE	Core Location
PERIPH	Periphery Location
STATE	State Location
SECTOR0	Missing

ALL WOMEN

CORRELATION COEFFICIENTS.

A VALUE OF 99.00000 IS PRINTED
IF A COEFFICIENT CANNOT BE COMPUTED.

PPCAT4	-.46422										
PPCAT1	-.39082	.69169									
VAR096	.26927	-.01724	.03133								
VAR095	.42787	-.08938	-.07267	.19671							
VAR032	.35703	-.51250	-.53952	-.00377	.00429						
VAR042	.24871	-.07518	.02403	.11765	.23694	-.09254					
SQVAR042	.14065	.00464	.04471	.06264	.14693	-.11491	.52240				
NVAR029	.12109	.01767	.03259	-.10692	.17403	-.20540	.59170	.51496			
PPCAT5	-.16018	.20751	.21456	-.00454	-.00006	-.27243	.02894	.02995	.04418		
EXPER0	-.04753	.02383	.01937	-.02946	-.03833	-.07268	.01629	-.00198	.04921	.01964	
EXPER1	.11859	-.06156	-.06709	.17694	.12894	.10094	.01931	.02689	-.35164	-.04633	-.23111
EXPER2	.13361	-.03733	.00102	.02657	.10032	-.01930	.31473	.21673	.32600	.03755	-.06623
EXPER3	.04874	-.02072	-.00232	.01224	.06413	-.00539	.10238	.04225	.16172	.01163	-.05673
EXPER4	.00466	.00731	-.00204	-.00659	.04364	.00578	.00772	-.02749	.05339	-.00776	-.05648
EXPER5	-.12396	.02752	.02418	-.00160	-.17813	-.00731	-.06187	-.06618	-.03282	-.02134	-.04397
EXPER6	-.15473	.02471	.00846	-.28088	-.14845	-.01934	-.23214	-.12253	.05611	.00846	-.05218
EXPER7	-.12273	.10912	.09554	-.10783	-.11290	-.13172	-.24442	-.13007	.06668	.04715	-.05539
AGESQ	.09361	.03064	.04187	-.09812	.15945	-.20207	.58624	.53119	.98863	.04271	.04907
CORE	.01102	.05144	.11237	.10168	.04393	-.02336	-.00768	-.01452	-.12732	.00932	-.02731
PERIPH	-.23778	.24991	.23981	-.10623	-.08362	-.25962	.00266	.02187	.08576	.09043	.02799
STATE	.27220	-.33842	-.34484	.02610	.05273	.29110	.00484	-.00975	.01714	-.08996	-.00607
SECTOR0	-.01564	.01812	.01389	.01245	-.02037	-.00288	-.01617	-.01425	-.02002	-.02392	-.00796

VAR1021	-.17872	.11584	.12476	-.08625	-.04443	-.06193	-.01528	.00217	.04008	.00097	-.00988
VAR1022	.01505	-.00046	-.00797	.05013	-.00923	-.03382	-.00497	.00124	.00643	.02815	.02009
VAR1023	.19504	-.17190	-.16602	.05514	.06345	.10256	.01942	-.00209	-.04871	-.02208	-.01866
VAR1024	.00699	.05904	.04150	-.00059	.00256	.01233	.01078	-.00093	-.00831	-.00984	.02110
VAR1029	-.01584	.01612	.01389	.01245	-.02037	-.00288	-.01617	-.01425	-.02002	-.02392	-.00798
VAR061BI	-.00907	-.01761	-.03428	.12108	-.03707	.14263	-.11178	-.05405	-.34920	-.02553	-.02557
VAR061M	-.01477	-.00210	.00586	-.12336	.00667	-.09710	.00946	-.02396	.15915	.03710	.01131
VAR061BE	.00394	.01745	.03794	.01296	.00481	-.04580	.04587	.02855	.06156	.00018	-.00945
VAR061D	.06504	-.00491	-.00153	.05001	.04154	.04222	.06762	.03149	.04957	-.05717	.00216
VAR061W	.00241	.03543	.02064	-.02286	.02925	-.07213	.12936	.12506	.29803	.00852	.03300
VAR061NA	-.02277	.00691	.00912	-.00578	-.00395	-.01755	.00090	.00668	-.00512	.02182	.01501

	INCOME	PPCAT4	PPCAT1	VAR096	VAR095	VAR032	VAR042	SQVAR042	NVAR029	PPCAT5	EXPER0

ALL MALES

VARIABLE	MEAN	STANDARD DEV	CASES
INCOME	8471.1895	5167.5866	15807
PPCAT4	9.7939	3.9094	15807
PPCAT1	11.1491	3.8980	15807
VAR095	39.1859	3.9124	15807
VAR095	45.2937	10.4724	15807
VAR032	10.7899	3.5750	15807
VAR042	18.4177	14.2294	15807
SQVAR042	541.6754	699.0982	15807
NVAR029	39.0665	13.1325	15807
PPCAT5	10.6772	3.0672	15807
EXPER0	.0765	.1875	15807
EXPER1	.8057	.3957	15807
EXPER2	.0418	.2001	15807
EXPER3	.0141	.1191	15807
EXPER4	.0143	.1186	15807
EXPER5	.0244	.1542	15807
EXPER6	.0154	.1231	15807
EXPER7	.0479	.2135	15807
AGESQ	1699.2863	1103.6058	15807
CORE	.2436	.4293	15807
PERIPH	.5332	.4989	15807
STATE	.2226	.4160	15807
SECTOR0	.0006	.0253	15807
VAR1021	.3909	.4880	15807
VAR1022	.1795	.3838	15807
VAR1023	.3119	.4633	15807
VAR1024	.1171	.3215	15807
VAR1029	.0006	.0253	15807
VAR6151	.1788	.3832	15807
VAR061M	.7965	.4098	15807
VAR061SE	.0142	.1184	15807
VAR061D	.0097	.0993	15807
VAR061W	.0090	.0669	15807
VAR061NA	.0028	.0527	15807

ALL MALES

CORRELATION COEFFICIENTS.

A VALUE OF 99.00000 IS PRINTED
IF A COEFFICIENT CANNOT BE COMPUTED.

PPCAT4	-.44302											
PPCAT1	-.31155	.59173										
VAR096	.12543	.01039	.02611									
VAR095	.37816	-.14935	-.06580	.16026								
VAR032	.35006	-.51301	-.52261	-.01475	.04819							
VAR042	.15073	.02437	.14324	.03382	.21346	-.25783						
SDVAR042	.04231	.05444	.14295	-.00745	.12332	-.26725	.93815					
NVAR029	.16995	-.02223	.06008	-.01788	.19458	-.25167	.79138	.74414				
PPCAT5	-.18066	.24622	.24444	.01904	-.00613	-.27712	.04115	.03625	.02144			
EXPER0	-.06132	.05003	.02736	-.00930	-.04905	-.04915	.02085	.01685	.04382	.02256		
EXPER1	.15809	-.06902	-.01869	.08618	.20586	.06791	.16663	.09150	-.06271	-.03019	-.39615	
EXPER2	.01950	.00685	.01972	-.01182	.02779	-.03013	.14953	.14350	.17980	.00273	-.04062	
EXPER3	-.01570	-.00457	-.00763	.00224	-.00619	.01513	-.01630	-.02430	-.00324	.01208	-.02330	
EXPER4	-.02805	-.01605	-.01770	-.00436	-.01739	.07600	-.04709	-.04483	-.03706	-.00619	-.02340	
EXPER5	-.10214	.02540	-.00331	-.03465	-.14290	.02478	-.09164	-.07038	-.10284	.00253	-.03075	
EXPER6	-.09562	.03893	.02131	-.07919	-.18949	-.03547	-.16188	-.09490	-.03101	.01871	-.02433	
EXPER7	-.10052	.04821	-.00372	-.06857	-.14140	-.08026	-.29029	-.17378	.02378	.01772	-.04363	
AGESQ	.11518	-.00025	.07222	-.04045	.15597	-.25548	.77887	.76841	.98674	.02033	.05014	
CORE	.05646	.04583	.05017	.05007	.04406	-.02802	-.00458	-.01710	-.02848	.02193	-.00061	
PERIPH	-.13530	.07470	.07619	-.02075	-.08571	-.10724	-.00865	.01236	-.01378	.01437	.01189	
STATE	.10581	-.13832	-.14366	-.02517	.05999	.15710	.01677	.00396	.04791	-.04049	-.01453	
SECTOR0	-.02617	.02345	.00826	-.02659	-.04376	.00756	-.02753	-.01876	-.03276	.01041	.01817	
VAR1021	-.06361	-.07496	-.05672	-.04044	-.02596	.05597	.01543	.03638	.04080	-.05909	.00553	
VAR1022	-.04751	.06408	.06788	.02148	-.00249	-.08470	-.00061	-.00190	-.02484	.04028	.00597	
VAR1023	.08029	-.01925	-.01926	.00902	.00993	.00880	-.01682	-.03001	-.02413	.00818	-.00664	
VAR1024	.03962	.03930	.03216	.02484	.03148	.00287	.00371	-.00823	.00567	.02900	-.00737	
VAR1029	-.02617	.02345	.00826	-.02659	-.04376	.00756	-.02753	-.01976	-.03276	.01041	.01817	
VAR061B1	-.30106	.12045	.03683	-.06380	-.28564	.05848	-.33819	-.23520	-.39130	-.00801	.02437	
VAR061M	.28070	-.11212	-.03451	.07097	.26806	-.05204	.28841	.19421	.33010	.01374	-.02428	
VAR061B2	.02362	-.00945	-.00658	-.00040	-.00631	.01218	.00970	-.00206	.01099	-.01222	-.00919	
VAR061D	-.00666	-.00297	-.00229	-.00560	-.00085	.00626	.02008	.01338	.02257	-.01334	-.00830	
VAR061W	-.01079	.00262	.00324	-.04121	.00631	-.02815	.09040	.09966	.12046	-.00138	.01153	
VAR061NA	-.01585	.01858	.01414	-.00675	-.00240	-.01216	.00471	.01188	.00850	.00609	.02832	
	INCOME	PPCAT4	PPCAT1	VAR096	VAR095	VAR032	VAR042	SDVAR042	NVAR029	PPCAT5	EXPER0	

ALL MALES

EXPER2	-.42518										
EXPER3	-.24390	-.02501									
EXPER4	-.24495	-.02512	-.01441								
EXPER5	-.32182	-.03300	-.01893	-.01901							
EXPER6	-.25465	-.02611	-.01498	-.01504	-.01977						
EXPER7	-.45667	-.04683	-.02686	-.02698	-.03545	-.02805					
AGE80	-.07170	.17607	-.00829	-.03581	-.09282	-.02552	.03007				
CORE	-.00159	.03076	.00523	-.00213	-.00934	.00481	-.02291	-.03114			
PERIPH	-.01268	-.03697	-.01427	-.00564	.02025	.01316	.03651	-.00300	-.60653		
STATE	.01699	.01292	.01190	.00915	-.01503	-.02055	-.01980	.03741	-.30365	-.57180	
SECTOR0	-.00251	-.00528	-.00303	-.00304	.00626	-.00317	-.00568	-.02744	-.01436	-.02705	-.01354
VAR1021	-.00705	-.02173	.00685	-.00047	.02028	.01134	.00758	.05062	-.19412	.39165	-.26817
VAR1022	.00509	-.00257	-.01495	-.00078	-.00008	-.00895	.00260	-.02428	.17645	-.02932	-.14621
VAR1023	.00035	.01934	.01664	.00587	-.01185	-.00840	-.01199	-.03243	.00735	-.22200	.25969
VAR1024	.00736	.00980	-.01629	-.00657	-.01409	.00584	.00312	.00105	.07450	-.23737	.20837
VAR1029	-.00251	-.00528	-.00303	-.00304	.00626	-.00317	-.00568	-.02744	-.01436	-.02705	-.01354
VAR061SI	-.05800	-.06444	-.01243	.00914	.07732	.06845	.05295	-.33243	-.02648	.05774	-.04456
VAR061M	.06090	.05178	.00718	-.00811	-.07239	-.06375	-.05047	.27410	.02790	-.06037	.04595
VAR061SE	.01215	-.00515	-.00513	-.00369	.00168	.00727	-.00972	.00369	-.01019	.00871	.00025
VAR061D	-.00349	.00637	.02167	-.00678	-.00428	.00240	.00125	.01903	-.00065	.01703	-.01960
VAR061W	-.02675	.03885	.00711	.01415	.00504	-.00958	-.00686	.13687	.00253	.00140	-.00415
VAR061NA	-.02757	.00011	-.00533	-.00635	-.00228	-.00661	.03861	.01113	-.00454	-.00408	.00966

	EXPER1	EXPER2	EXPER3	EXPER4	EXPER5	EXPER6	EXPER7	AGE80	CORE	PERIPH	STATE
VAR1021	-.02027										
VAR1022	-.01184	-.37465									
VAR1023	-.01704	-.53937	-.31489								
VAR1024	-.00922	-.29171	-.17030	-.24518							
VAR1029	1.00000	-.02027	-.01184	-.01704	-.00922						
VAR061SI	.04343	.07443	.00254	-.02912	-.01673	.04343					
VAR061M	-.03947	-.04436	-.00155	.03579	.02064	-.03847	-.89550				
VAR061SE	-.00304	.02305	-.01498	-.00200	-.01398	-.00304	-.05606	-.23060			
VAR061D	-.00251	.01201	.00794	-.00779	-.01528	-.00251	-.04630	-.19044	-.01192		
VAR061W	-.00227	.00539	.01475	-.02543	.01102	-.00227	-.04179	-.17190	-.01076	-.00889	
VAR061NA	-.00134	.01134	-.01238	-.00466	.00438	-.00134	-.02464	-.10137	-.00635	-.00524	-.00473

	SECTOR0	VAR1021	VAR1022	VAR1023	VAR1024	VAR1029	VAR061SI	VAR061M	VAR061SE	VAR061D	VAR061W

ALL WOMEN

VARIABLE	MEAN	STANDARD DEV	CASES
INCOME	4638.6891	2850.6180	6886
PPCAT4	9.7781	3.6885	6886
PPCAT1	10.1952	3.7462	6886
VAR096	36.0811	8.2761	6886
VAR095	41.9294	13.4804	6886
VAR032	11.5195	2.8261	6886
VAR042	10.7969	11.3294	6886
SQVAR042	244.9108	494.8823	6886
NVAR029	36.2610	13.2024	6886
PPCAT5	10.4590	3.2276	6886
EXPER0	.0439	.2049	6886
EXPER1	.5073	.4986	6886
EXPER2	.0872	.2822	6886
EXPER3	.0656	.2475	6886
EXPER4	.0650	.2465	6886
EXPER5	.0819	.2742	6886
EXPER6	.0560	.2299	6886
EXPER7	.0827	.2424	6886
AGESQ	1489.6726	1052.6598	6886
CORE	.1920	.3939	6886
PERIPH	.4585	.4983	6886
STATE	.3491	.4764	6886
SECTOR0	.0014	.0372	6886
VAR1021	.5091	.5000	6886
VAR1022	.2212	.4151	6886
VAR1023	.2189	.4136	6886
VAR1024	.0503	.2187	6886
VAR1029	.0014	.0372	6886
VAR061SI	.2814	.4497	6886
VAR061M	.5119	.4874	6886
VAR061SE	.0343	.1820	6886
VAR061D	.0275	.1636	6886
VAR061W	.0429	.2026	6886
VAR061NA	.0020	.0447	6886

ALL WOMEN

	EXPER1	EXPER2	EXPER3	EXPER4	EXPER5	EXPER6	EXPER7	AGESQ	CORE	PERIPH	STATE
EXPER2	-.33348										
EXPER3	-.28573	-.08188									
EXPER4	-.28438	-.08150	-.06983								
EXPER5	-.32209	-.09230	-.07909	-.07871							
EXPER6	-.26275	-.07530	-.06452	-.06421	-.07272						
EXPER7	-.27892	-.07993	-.06849	-.06816	-.07720	-.06298					
AGESQ	-.31961	.32244	.14146	.03433	-.04782	.04811	.06966				
CORE	.07945	-.01582	-.01154	-.00863	-.00687	-.05952	-.03709	-.12344			
PERIPH	-.08021	-.00441	-.00961	-.00027	.01708	.07325	.06777	.08686	-.44858		
STATE	.01603	.01859	.02037	.00823	-.01226	-.02669	-.03946	.01264	-.35624	-.67239	
SECTOR0	.02791	-.01152	-.00987	-.00982	.00094	-.00908	-.00964	-.01822	-.01817	-.03429	-.02723
VAR1021	-.02816	-.01235	-.01212	.00236	.01858	.04232	.02946	.04507	.04054	.42532	-.47544
VAR1022	-.02077	.01465	.00852	-.00298	-.01509	-.00291	.02285	.00359	-.01109	-.16920	.18771
VAR1023	.05565	.00080	.00239	-.00528	-.01415	-.03124	-.05106	-.05252	-.03206	-.26075	.30079
VAR1024	-.00619	.00088	.00870	.01192	.01278	-.03062	-.01253	-.00744	-.00791	-.15227	.16647
VAR1029	.02791	-.01152	-.00987	-.00992	.00094	-.00908	-.00964	-.01822	-.01817	-.03429	-.02723
VAR061SI	.31063	-.14198	-.13872	-.11314	-.08637	-.08395	-.01802	-.30022	.04068	-.07083	.03980
VAR061M	-.21945	.08914	.10700	.07414	.08076	.09015	.01192	.11048	-.02981	.05764	-.03405
VAR061SE	-.05920	.02709	.03669	.05761	.01810	-.00775	-.01280	.05285	.00929	.00715	-.01462
VAR061D	-.02751	.04871	.03069	.02887	-.00505	-.02153	-.03681	.03857	.01171	-.02874	.01931
VAR061W	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
VAR061NA	-.01206	.00455	-.01186	-.00571	-.01337	-.01091	.05023	-.00366	-.00530	.01948	-.01566

	SECTOR0	VAR1021	VAR1022	VAR1023	VAR1024	VAR1029	VAR061SI	VAR061M	VAR061SE	VAR061D	VAR061W
VAR1021	-.03787										
VAR1022	-.01986	-.54169									
VAR1023	-.01973	-.53808	-.28220								
VAR1024	-.00858	-.23400	-.12272	-.12190							
VAR1029	1.00000	-.03787	-.01986	-.01973	-.00858						
VAR061SI	.00838	-.03013	.00589	.01372	.03031	.00838					
VAR061M	-.02034	.01335	-.00730	.01307	-.03792	-.02034	-.78577				
VAR061SE	-.00702	.02004	-.00461	-.01153	-.01406	-.00702	-.11795	-.23663			
VAR061D	.01377	.00127	.00113	-.01953	.02956	.01377	-.10527	-.21121	-.03170		
VAR061W	.02590	.01420	.00588	-.03331	.01496	.02590	-.13246	-.26575	-.03989	-.03560	
VAR061NA	-.00167	.00695	.00834	-.01116	-.01031	-.00167	-.02803	-.05624	-.00844	-.00753	-.00948

MALES IN THE STATE

VARIABLE	MEAN	STANDARD DEV	CASES
INCOME	9491.1417	4996.8194	3518
PPCAT4	8.7702	4.4355	3518
PPCAT1	10.1025	4.5070	3518
VAR096	39.0019	4.0925	3518
VAR095	46.4678	9.4691	3518
VAR032	11.8336	3.7530	3518
VAR042	18.8637	13.8227	3518
SQVAR042	546.8514	663.3823	3518
NVAR029	40.2424	12.5222	3518
PPCAT5	10.4450	3.2267	3518
EXPER0	.0314	.1744	3518
EXPER1	.8183	.3857	3518
EXPER2	.0466	.2108	3518
EXPER3	.0183	.1284	3518
EXPER4	.0163	.1266	3518
EXPER5	.0200	.1402	3518
EXPER6	.0107	.1028	3518
EXPER7	.0400	.1960	3518
AGESQ	1776.4439	1049.5592	3518
VAR1021	.1463	.3535	3518
VAR1022	.0746	.2628	3518
VAR1023	.5368	.4987	3518
VAR1024	.2423	.4285	3518
VAR1029	0	0	3518
VAR061SI	.1469	.3540	3518
VAR061M	.8217	.3828	3518
VAR061SE	.0143	.1187	3518
VAR061D	.0062	.0782	3518
VAR061W	.0073	.0850	3518
VAR061NA	.0037	.0610	3518

MALES IN THE STATE

CORRELATION COEFFICIENTS.

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PPCAT4	-.49261										
PPCAT1	-.39860	.68698									
VAR096	.08973	.07668	.08005								
VAR095	.40795	-.11914	-.05389	.11564							
VAR032	.45820	-.64836	-.62854	-.06652	.05212						
VAR042	.11502	.15211	.24079	.08114	.20791	-.31347					
SQVAR042	.00333	.16980	.23204	.05186	.10348	-.32334	.93926				
NVAR029	.15927	.08798	.14828	.03362	.20174	-.28950	.79018	.72538			
PPCAT5	-.15828	.25185	.25009	.04916	.00530	-.29866	.08514	.03125	.05384		
EXPER0	-.07581	.06717	.03908	.00705	-.02587	-.07198	.02971	.01965	.07336	.01811	
EXPER1	.15156	-.05862	-.02560	.02109	.16101	.06549	.13183	.06745	-.09473	-.00834	-.38129
EXPER2	.00068	.02378	.03193	.01199	.03440	-.02907	.16453	.14000	.16957	-.01552	-.03980
EXPER3	.00483	-.01388	-.01566	.00224	-.01099	.02108	-.00383	-.00981	.00981	.04640	-.02351
EXPER4	-.01059	-.06222	-.05943	.00545	-.02070	.08670	-.06382	-.05783	-.05572	-.02977	-.02716
EXPER5	-.10118	.01027	-.01182	.02985	-.12031	.02392	-.09189	-.06142	-.10550	-.00820	-.02574
EXPER6	-.12367	.02764	.02756	-.03782	-.24158	-.05763	-.14175	-.08562	-.02520	.01946	-.01869
EXPER7	-.09069	.05750	.02793	-.06732	-.09786	-.09746	-.27856	-.16826	.05695	.00149	-.03673
AGESQ	.10857	.11157	.16392	.02006	.16168	-.30095	.77823	.74298	.98956	.05521	.05020
VAR1021	-.00735	-.04217	-.07960	-.03284	-.06855	.06823	-.00497	.00700	.02185	-.02964	.00201
VAR1022	-.09806	-.00757	-.03437	.02046	.00550	-.05985	-.00198	.02450	.03080	-.00167	-.00620
VAR1023	.13123	-.07177	-.04700	.00684	.05297	.05330	-.02179	-.04381	-.04672	.00336	.01593
VAR1024	-.08651	.12050	.14143	.00681	-.01012	-.08160	.03066	.03018	.01747	.02156	-.02009
VAR1029	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000
VAR061SI	-.27953	.08044	.01517	-.09178	-.33629	.05907	-.33240	-.22645	-.37760	-.02727	.00504
VAR061M	.25964	-.07729	-.02051	.09611	.29986	-.05633	.28859	.19087	.32450	.02529	-.01832
VAR061SE	.03599	-.03278	-.03127	-.02387	.02021	.03361	.00520	-.00063	.00456	-.00817	-.02167
VAR061D	-.00020	.01013	.02460	.01919	.01979	.00916	.00220	-.00425	.01062	-.00434	-.01416
VAR061W	-.03573	.02082	.02534	-.01609	.01992	-.03407	.06644	.07259	.08556	.01107	.06234
VAR061NA	-.02714	.04000	.03448	-.02625	-.02118	-.01896	.01258	.02196	.01333	.00560	.05923
	INCOME	PPCAT4	PPCAT1	VAR096	VAR095	VAR032	VAR042	SQVAR042	NVAR029	PPCAT5	EXPER0

MALES IN THE STATE

EXPER2	-.46916										
EXPER3	-.27711	-.02888									
EXPER4	-.27307	-.02846	-.01681								
EXPER5	-.30342	-.03162	-.01868	-.01840							
EXPER6	-.22035	-.02296	-.01356	-.01337	-.01485						
EXPER7	-.43304	-.04513	-.02665	-.02627	-.02919	-.02119					
AGES0	-.10129	.16693	.00597	-.05708	-.09484	-.02215	.06081				
VAR1021	-.02793	-.00262	.04276	.01989	.04912	.03322	-.03743	.02347			
VAR1022	-.02858	-.00990	-.00369	.00103	.01127	.00599	.05763	.03682	-.11755		
VAR1023	.00414	.01896	.00878	-.00732	-.03585	-.02532	-.00484	-.05866	-.44566	-.30566	
VAR1024	.03575	-.01384	-.04323	-.00852	-.00571	-.00160	.00116	.02633	-.23410	-.16056	-.60874

VAR1029	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000
VAR061BI	-.05020	-.06266	.00168	.05171	.06466	.06132	.04868	-.32481	.03477	-.01878	-.05063
VAR061M	.03713	.04909	-.01627	-.03725	-.05801	-.05176	-.03845	.27342	-.03085	.01326	.04625
VAR061BE	.03198	-.00873	-.01008	-.01549	-.01722	-.01250	.00123	.00107	-.00508	-.01099	.03274
VAR061D	.01248	-.01739	.03803	-.01012	-.00070	.00937	-.01606	.00764	.01422	-.00285	.00616
VAR061W	-.07444	.04839	.05029	-.01101	.04929	-.00889	-.01746	.09667	-.00887	.04897	-.04759
VAR061NA	-.04176	.02749	-.00799	-.00788	.01717	-.00636	.00128	.02264	-.00421	-.01738	-.00172

	EXPER1	EXPER2	EXPER3	EXPER4	EXPER5	EXPER6	EXPER7	AGES6	VAR1021	VAR1022	VAR1023

VAR1029	99.00000						
VAR061BI	.04176	99.00000					
VAR061M	-.03651	99.00000	-.89070				
VAR061BE	-.02717	99.00000	-.04995	-.25843			
VAR061D	-.01716	99.00000	-.03264	-.16887	-.00947		
VAR061W	.03267	99.00000	-.03550	-.18368	-.01030	-.00673	
VAR061NA	.01614	99.00000	-.02540	-.13139	-.00737	-.00482	-.00524

	VAR1024	VAR1029	VAR061BI	VAR061M	VAR061BE	VAR061D	VAR061W

FEMALES IN THE STATE

VARIABLE	MEAN	STANDARD DEV	CASES
INCOME	5700.4459	3283.1581	2397
PPCAT4	8.0700	4.2135	2397
PPCAT1	8.4278	4.3029	2397
VAR096	36.3766	7.8056	2397
VAR095	42.9022	12.6802	2397
VAR032	12.6453	1.5272	2397
VAR042	10.8719	10.9666	2397
SQVAR042	238.4142	460.8612	2397
NVAR029	34.5706	13.0395	2397
PPCAT5	10.0617	3.5402	2397
EXPER0	.0422	.2011	2397
EXPER1	.5456	.4977	2397
EXPER2	.0944	.2925	2397
EXPER3	.0725	.2593	2397
EXPER4	.0678	.2514	2397
EXPER5	.0773	.2670	2397
EXPER6	.0476	.2130	2397
EXPER7	.0496	.2171	2397
AGESQ	1507.8829	1048.4725	2397
VAR1021	.1803	.3846	2397
VAR1022	.3279	.4695	2397
VAR1023	.3892	.4877	2397
VAR1024	.1002	.3003	2397
VAR1029	0	0	2397
VAR061BI	.3059	.4609	2397
VAR061M	.5892	.4921	2397
VAR061BE	.0307	.1724	2397
VAR061O	.0318	.1756	2397
VAR061W	.0414	.1992	2397
VAR061NA	.0010	.0321	2397

FEMALES IN THE STATE

CORRELATION COEFFICIENTS.

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PPCAT4	-.47006										
PPCAT1	-.42539	.75287									
VAR096	.27071	-.00712	.03499								
VAR095	.43918	-.02633	-.00092	.22359							
VAR032	.45111	-.55003	-.58527	.01672	-.03693						
VAR042	.31130	.00519	.04472	.12202	.25342	-.07734					
SQVAR042	.19043	.04396	.07200	.07383	.15250	-.11417	.92130				
NVAR029	.16873	.07102	.07844	-.04744	.18344	-.17735	.62718	.53851			
PPCAT5	-.15700	.17814	.17813	-.01548	.01401	-.29851	.04605	.03172	.08297		
EXPER0	-.04038	.03494	.02748	-.02022	-.03987	-.03504	.00750	-.01178	.03258	.02174	
EXPER1	.10497	-.06713	-.05015	.10940	.10500	.12656	-.01980	.00532	-.06797	-.06772	-.05143
EXPER2	.19938	-.03970	-.01034	.07521	.12281	-.01162	.32856	.22079	.33952	.08420	-.06776
EXPER3	.02994	-.01645	-.00102	.03567	.04556	-.03958	.09985	.03512	.15427	.03236	-.05866
EXPER4	-.01618	.01129	.01906	.00475	.05496	-.01448	.02373	-.00223	.08134	.00268	-.05658
EXPER5	-.12410	.02876	.03454	-.00966	-.15840	-.00121	-.08672	-.08652	-.06002	-.03048	-.06072
EXPER6	-.18247	.02554	.02761	-.28903	-.19073	-.01990	-.22169	-.11568	.05238	.01229	-.04692
EXPER7	-.13044	.11317	.10451	-.08612	-.10596	-.13848	-.22646	-.11817	.06448	.03244	-.04793
AGE80	.14314	.08901	.09131	-.03982	.17097	-.18209	.61920	.55173	.99013	.07971	.03226
VAR1021	-.07633	.05243	.08110	-.00767	-.04086	-.02950	.01257	.02760	.10870	-.04309	-.04943
VAR1022	-.08223	.01512	.01981	.03543	-.01112	-.10822	-.02734	-.00788	.01040	.05929	.05657
VAR1023	.19767	-.17213	-.17893	.00225	.03487	.17640	.01185	-.01529	-.09089	-.03139	-.03986
VAR1024	-.09547	.18841	.15520	-.04918	.01349	-.07927	.00732	.00162	-.00859	.01376	.03991
VAR1029	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000
VAR061BI	.01059	.00752	-.02043	.07556	-.01052	.13143	-.10426	-.04144	-.31595	-.03416	-.03789
VAR061M	-.03055	-.04078	-.01886	-.09872	-.02861	-.07964	.01053	-.01959	.13623	.03009	.03188
VAR061BE	.01758	.01957	.03017	-.00682	.02935	-.05332	.03842	.02556	.05571	.01361	-.02363
VAR061D	.03026	.01136	.02446	.05336	.02473	.02229	.08410	.05105	.09027	-.03995	.01079
VAR061W	.01366	.05244	.04251	.02549	.04667	-.08030	.11253	.07974	.27973	.02690	.02097
VAR061NA	-.02845	.02711	.02387	.01492	.00563	-.00345	-.02913	-.01631	-.02652	.00824	-.00675
	INCOME	PPCAT4	PPCAT1	VAR096	VAR095	VAR032	VAR042	SQVAR042	NVAR029	PPCAT5	EXPER0

FEMALES IN THE STATE

EXPER2	-.35606										
EXPER3	-.30822	-.09024									
EXPER4	-.29730	-.08705	-.07535								
EXPER5	-.31909	-.09342	-.08087	-.07801							
EXPER6	-.24655	-.07219	-.06249	-.06027	-.06469						
EXPER7	-.25186	-.07374	-.06383	-.06157	-.06608	-.05106					
AGES0	-.33840	.33347	.16683	.06559	-.07408	.04347	.06998				
VAR1021	-.02577	-.03501	.01977	.01865	.02684	.05127	.02351	.10785			
VAR1022	-.00996	.01231	-.03235	-.02057	-.01571	-.00996	.04541	.01306	-.33034		
VAR1023	.03252	.01355	.02775	-.00645	-.02000	-.00770	-.04941	-.09564	-.37753	-.55747	
VAR1024	-.00405	.00382	-.01993	.01863	.02249	-.03794	-.02103	-.00394	-.15780	-.23301	-.26629
VAR1029	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000
VAR061SI	.30645	-.13665	-.15365	-.10166	-.06327	-.11368	.00261	-.27477	-.04765	.01442	-.00268
VAR061M	-.22712	.03586	.13302	.06485	.05959	.11548	-.00674	.09760	.03264	-.03933	.04779
VAR061SE	-.03775	.01278	-.01211	.07914	.01693	-.00128	-.00546	.04550	.02380	.00461	-.01122
VAR061D	-.04459	.04334	.06172	-.00977	.01594	-.01505	-.03406	.07142	.00703	.01546	-.03949
VAR061W	-.07487	.13062	-.02650	.01267	-.02602	-.00670	.02712	.29642	.00543	.03673	-.06320
VAR061NA	-.03545	-.01038	-.00998	.01527	-.00930	-.00719	.11303	-.02585	-.01520	.04602	-.03586

	EXPER1	EXPER2	EXPER3	EXPER4	EXPER5	EXPER6	EXPER7	AGES0	VAR1021	VAR1022	VAR1023

VAR1029	99.00000						
VAR061SI	.04315	99.00000					
VAR061M	-.05315	99.00000	-.79503				
VAR061SE	-.01978	99.00000	-.11807	-.21298			
VAR061D	.03083	99.00000	-.12040	-.21717	-.03225		
VAR061W	.03509	99.00000	-.13794	-.24891	-.03695	-.03768	
VAR061NA	-.01672	99.00000	-.02134	-.03849	-.00572	-.00583	-.00868

	VAR1024	VAR1029	VAR061SI	VAR061M	VAR061SE	VAR061D	VAR061W

MALES IN THE CORE

VARIABLE	MEAN	STANDARD DEV	CASES
INCOME	8995.2347	4936.6862	3851
PPCAT4	10.0965	3.8646	3851
PPCAT1	11.4936	3.6069	3851
VAR094	39.5311	2.9369	3851
VAR095	46.1067	9.6790	3851
VAR032	10.6133	3.3556	3851
VAR042	18.3029	13.6257	3851
SQVAR042	520.6077	653.1775	3851
NVAR029	38.4076	12.7586	3851
PPCAT5	10.7857	3.0775	3851
EXPER0	.0262	.1668	3851
EXPER1	.0946	.3966	3851
EXPER2	.0526	.2233	3851
EXPER3	.0152	.1225	3851
EXPER4	.0138	.1168	3851
EXPER5	.0213	.1442	3851
EXPER6	.0164	.1272	3851
EXPER7	.0393	.1945	3851
AGE80	1438.7262	1056.8626	3851
VAR1021	.2240	.4170	3851
VAR1022	.2988	.4578	3851
VAR1023	.3183	.4657	3851
VAR1024	.1593	.3660	3851
VAR1029	0	0	3851
VAR061SI	.1609	.3675	3851
VAR061M	.8066	.3950	3851
VAR061SE	.0121	.1094	3851
VAR061D	.0096	.0977	3851
VAR061N	.0064	.0910	3851
VAR061N4	.0024	.0495	3851

MALES IN THE CORE

EXPER2	-.47822										
EXPER3	-.25236	-.02931									
EXPER4	-.24020	-.02750	-.01472								
EXPER5	-.30314	-.03521	-.01858	-.01769							
EXPER6	-.26235	-.03047	-.01608	-.01531	-.01932						
EXPER7	-.41023	-.04765	-.02514	-.02393	-.03020	-.02614					
AGE82	-.09760	.22154	-.07564	-.02764	-.10088	-.00290	-.01281				
VAR1021	.00902	-.03058	.00828	.00220	.01090	.01154	-.00504	.02469			
VAR1022	-.01378	.00791	-.02389	.01171	.00805	-.01594	.03977	-.00779	-.35069		
VAR1023	.02684	.00056	.03077	.00128	-.01027	-.02551	-.04820	.00056	-.36691	-.44548	
VAR1024	-.02721	.02427	-.01870	-.01678	-.00571	.03926	.01734	-.01909	-.23385	-.28413	-.29719
VAR1029	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000
VAR061SI	-.04864	-.08485	-.02157	-.01408	.09955	.08250	.08133	-.32264	-.00059	.00742	.00913
VAR061M	.04022	.06389	.03029	.00567	-.07614	-.07305	-.07896	.25429	-.00553	-.01090	-.00295
VAR061SE	-.01499	.00884	-.01377	.00920	.04052	.01057	-.02208	.02517	.00827	.00089	.00280
VAR061D	-.00742	.01284	-.01207	-.01168	-.01474	-.01275	.02093	.03163	.00893	.01029	-.01306
VAR061W	-.01543	.02409	-.01142	.03164	-.01771	-.01187	-.01309	.14502	-.01017	.01501	-.03649
VAR061NA	-.05173	-.01146	-.03605	-.00576	-.00727	-.00629	.06764	-.01995	.03201	-.01528	-.01599

	EXPER1	EXPER2	EXPER3	EXPER4	EXPER5	EXPER6	EXPER7	AGE82	VAR1021	VAR1022	VAR1023

VAR1029	99.00000						
VAR061SI	-.02023	99.00000					
VAR061M	.02359	99.00000	-.39441				
VAR061SE	-.01410	99.00000	-.04847	-.22617			
VAR061D	-.00642	99.00000	-.04720	-.22047	-.01972		
VAR061W	.00103	99.00000	-.04019	-.18745	-.01016	-.00915	
VAR061NA	.00305	99.00000	-.02170	-.09935	-.00838	-.00450	-.00446

	VAR1024	VAR1029	VAR061SI	VAR061M	VAR061SE	VAR061D	VAR061W

MALES IN THE CORE

CORRELATION COEFFICIENTS.

A VALUE OF 99.00000 IS PRINTED
IF A COEFFICIENT CANNOT BE COMPUTED.

	INCOME	PPCAT4	PPCAT1	VAR096	VAR095	VAR032	VAR042	SQVAR042	NVAR029	PPCAT5	EXPER0
PPCAT4	-.42126										
PPCAT1	-.23793	.51474									
VAR096	.09677	-.01302	.01086								
VAR095	.39475	-.15033	-.07699	.13296							
VAR032	.27241	-.42458	-.44040	-.01283	-.00971						
VAR042	.25103	-.03369	.09417	.03523	.22592	-.25678					
SQVAR042	.14040	-.00631	.09260	.00691	.13848	-.25183	.94169				
NVAR029	.26129	-.02586	.03102	.02973	.21118	-.25745	.51619	.76672			
PPCAT5	-.11069	.23506	.22510	.01072	.01260	-.23781	.02587	.01576	.00158		
EXPER0	-.06701	.05305	.03620	-.05122	-.06015	-.06557	.05127	.04418	.06134	.01963	
EXPER1	.16510	-.08207	-.00929	.06156	.15971	.07278	.11317	.04258	-.07985	-.03904	-.39325
EXPER2	.03422	.00695	.03157	-.00253	.04259	-.06235	.20726	.18619	.22034	.02314	-.04568
EXPER3	-.02231	-.00149	-.01245	.00517	.00776	.01479	-.04339	-.04463	-.03178	.00493	-.02410
EXPER4	-.03815	-.00366	-.01488	-.03738	-.00170	.01298	-.04861	-.04790	-.03005	-.01806	-.02294
EXPER5	-.11997	.04718	.01108	.02367	-.16972	.04052	-.10192	-.07690	-.11180	.00620	-.02895
EXPER6	-.08478	.04001	.01370	-.06444	-.15525	-.02541	-.17370	-.10307	-.01003	.02696	-.02506
EXPER7	-.12918	.04989	.00858	-.04921	-.15293	-.04481	-.27161	-.16116	-.02098	.01965	-.03918
AGESQ	.21152	-.05126	.03816	.00875	.16976	-.25174	.80423	.78827	.98783	-.00409	.06893
VAR1021	.04206	-.21239	-.12905	-.06596	.00536	.15591	-.00200	.01144	.01747	-.12856	-.00054
VAR1022	-.06430	.13852	.09665	-.00129	-.03504	-.09635	.00950	.00742	-.00460	.03747	-.00631
VAR1023	-.00578	.02493	.00579	.02594	.03307	-.02120	.00888	.00489	-.00035	.02366	-.00318
VAR1024	.03987	.03699	.01578	.04375	-.00437	-.03013	-.02091	-.02853	-.01370	.06948	.01256
VAR1029	99.00000	99.00000	99.00600	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000
VAR061BI	-.31962	.10240	.01980	-.09745	-.31285	.09451	-.33546	-.23203	-.37947	-.01712	.00863
VAR061M	.29573	-.10049	-.03746	.08705	.30220	-.07265	.27656	.18283	.30728	.02025	-.02614
VAR061BE	-.01387	.03700	.05448	.01768	-.03519	-.00320	.02820	.02641	.03012	.03186	.00844
VAR061D	.01947	-.01134	.00635	-.01406	.00085	-.00098	.02979	.01668	.03695	-.05044	.00565
VAR061W	.01238	-.01403	-.00506	.00540	-.00213	-.05218	.09549	.09755	.15036	-.01240	.02462
VAR061NA	-.01733	.00901	.02488	.00777	-.00894	-.01730	-.01327	-.00486	-.01824	.01784	.07091

FEMALES IN THE CORE

VARIABLE	MEAN	STANDARD DEV	CASES
INCOME	4703.1454	2329.6974	1322
PPCAT4	10.4699	3.0081	1322
PPCAT1	11.0586	2.6496	1322
VAR096	37.8070	6.2269	1322
VAR095	43.1440	12.9669	1322
VAR032	11.3841	2.3990	1322
VAR042	10.6184	10.8510	1322
SQVAR042	230.4069	455.3170	1322
NVAR029	32.8133	13.0741	1322
PPCAT5	13.5207	3.2464	1322
EXPERC	.0324	.1772	1322
EXPER1	.4194	.4858	1322
EXPER2	.0761	.2684	1322
EXPER3	.0597	.2370	1322
EXPER4	.0636	.2387	1322
EXPER5	.0780	.2683	1322
EXPER6	.0279	.1648	1322
EXPER7	.0442	.2057	1322
AGESQ	1223.1501	919.7268	1322
VAR1021	.5497	.4977	1322
VAR1022	.2118	.4087	1322
VAR1023	.1917	.3938	1322
VAR1024	.0468	.2113	1322
VAR1029	0	0	1322
VAR061BI	.7189	.4502	1322
VAR061M	.5821	.4934	1322
VAR061BE	.0378	.1907	1322
VAR061D	.0314	.1746	1322
VAR061W	.0282	.1657	1322
VAR061NA	.0015	.0389	1322

FEMALES IN THE CORE

CORRELATION COEFFICIENTS.

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	INCOME	PPCAT4	PPCAT1	VAR096	VAR095	VAR032	VAR042	SQVAR042	NVAR029	PPCAT5	EXPER0
PPCAT4	-.30139										
PPCAT1	-.18410	.49291									
VAR096	.20600	-.03517	.03855								
VAR095	.49564	-.10898	.00357	.16335							
VAR032	.18951	-.39229	-.44999	-.01679	-.01593						
VAR042	.31756	-.05265	-.00307	.05222	.22283	-.10965					
SQVAR042	.21865	-.04278	.01036	.01755	.14140	-.11282	.92447				
NVAR029	[illegible]	[illegible]	.01142	[illegible]	.19128	[illegible]	[illegible]	[illegible]			
PPCAT5	-.10940	.17406	.17153	.02720	.02114	-.21375	.00771	.02578	-.00557		
EXPER0	-.03354	-.01393	-.03693	-.09937	-.02714	.00725	.06521	.06662	.09795	.03182	
EXPER1	.07851	-.06853	-.08953	.12395	.11033	.13575	-.10821	-.08842	-.38929	.00139	-.20332
EXPER2	.17210	-.03727	.03916	.02430	.12315	-.00474	.35491	.25702	.38049	.00345	-.05324
EXPER3	.03579	-.04214	.00993	.01702	.07229	-.05096	.15103	.09677	.19594	.01417	-.04612
EXPER4	-.00665	.02178	.00890	-.02220	.01782	-.00649	-.01342	-.04715	.02303	-.02933	-.04648
EXPER5	-.19365	.07380	.05569	.01093	-.25482	-.06637	-.06028	-.05967	.01419	-.05628	-.05323
EXPER6	-.07689	.03835	.01847	-.19760	-.13670	-.08949	-.16594	-.08581	.04282	.01086	-.03102
EXPER7	-.10044	.11884	.08367	-.08949	-.05997	-.09615	-.21057	-.10889	.03325	.04606	-.03937
AGESQ	.24736	-.02709	.02202	-.07106	.17831	-.19892	.72942	.66139	.98561	.00464	.09448
VAR1021	.02550	-.14520	-.15725	-.07581	.10327	.22244	-.06377	-.05292	-.12802	-.04110	-.00291
VAR1022	-.02735	.18083	.15712	.05647	-.09229	-.17786	.07865	.08232	.12030	.03978	-.05315
VAR1023	.00395	-.04739	-.00167	.03308	.00590	-.08139	.00770	-.00082	.04126	.00464	.04473
VAR1024	-.01450	.08054	.09314	.00768	-.07571	-.02822	-.01667	-.03307	-.00806	.01123	.02630
VAR1029	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000
VAR061BI	-.10934	-.02626	-.06027	.04934	-.09967	.13155	-.14623	-.06673	-.32660	.01648	-.06144
VAR061M	.04694	.02975	.02995	-.05372	.08605	-.07112	.00401	-.04528	.14343	-.00360	.05511
VAR061BE	.01824	.00154	.07008	.03411	.00059	-.12567	.06848	.02548	.06840	.03418	.00765
VAR061D	.10105	-.00507	-.04294	.04520	.06213	.01888	.07653	.04151	.08603	-.07125	-.00745
VAR061W	.04301	-.00761	.04605	-.03553	-.03136	-.03322	.24683	.25381	.33133	-.00332	.00949
VAR061NA	-.02299	-.01483	-.00462	-.12971	-.04487	-.00170	-.02896	-.01841	-.03772	.01441	-.00713
	INCOME	PPCAT4	PPCAT1	VAR096	VAR095	VAR032	VAR042	SQVAR042	NVAR029	PPCAT5	EXPER0

FEMALES IN THE CORE

	EXPER1	EXPER2	EXPER3	EXPER4	EXPER5	EXPER6	EXPER7	AGESQ	VAR1021	VAR1022	VAR1023
EXPER2	-.37098										
EXPER3	-.32123	-.07333									
EXPER4	-.32377	-.07390	-.06399								
EXPER5	-.37077	-.08463	-.07328	-.07386							
EXPER6	-.21611	-.04933	-.04271	-.04305	-.04930						
EXPER7	-.27422	-.06260	-.05420	-.05463	-.06256	-.03646					
AGESQ	-.35480	.37912	.17454	.00040	-.00263	.04202	.03006				
VAR1021	.08273	-.01809	-.04113	.00007	.00245	-.06350	-.07428	-.12876			
VAR1022	-.03696	-.00170	.02414	-.00661	-.01214	.07484	.07102	.11318	-.57268		
VAR1023	-.04032	.02132	-.00185	.00212	.00653	.00420	.01669	.05156	-.53810	-.25249	
VAR1024	-.04822	.00616	.05365	.00868	.00555	-.00303	.00649	-.01176	-.24479	-.11486	-.10792
VAR1029	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000
VAR061BI	.31927	-.15564	-.15904	-.09516	-.11543	-.01529	-.04160	-.27603	.01921	-.02479	-.00347
VAR061M	-.21315	.03626	.12811	.06131	.03928	.02414	.05410	.08974	.02407	-.00324	-.01475
VAR061BE	-.06554	.02511	.04245	.06148	.03569	-.01091	-.04262	.05676	-.06026	.04323	.02378
VAR061D	-.06713	.07745	.02061	.05700	.00153	.01344	-.03876	.07428	.03164	-.02336	-.03206
VAR061W	-.11385	.22208	-.00225	-.04330	.01891	-.02890	.02227	.37349	-.09795	.05898	.06405
VAR061NA	-.01546	-.01134	-.00982	-.00990	-.01133	-.00661	.10034	-.03266	.03528	-.02020	-.01598

	VAR1024	VAR1029	VAR061BI	VAR061M	VAR061BE	VAR061D	VAR061W
VAR1029	99.00000						
VAR061BI	.00918	99.00000					
VAR061M	[illegible]	[illegible]	[illegible]				
VAR061BE	[illegible]	[illegible]	[illegible]	[illegible]			
VAR061D	.03043	99.00000	-.12331	-.01265	-.03570		
VAR061W	-.00366	99.00000	-.11667	-.20120	-.03378	-.03072	
VAR061NA	-.00664	99.00000	-.02667	-.04599	-.00772	-.00702	-.00664

MALES IN THE PERIPHERY

VARIABLE	MEAN	STANDARD DEV	CASES
INCOME	7816.9937	5244.3245	8428
PPDAT4	10.0541	3.6148	8428
PPDAT1	11.4270	3.6700	8428
VAR096	39.1100	4.1930	8428
VAR095	44.4579	11.0979	8428
VAR032	10.4302	3.5134	8428
VAR042	18.3026	14.6562	8428
SQVAR042	549.7633	733.1529	8428
NVAR029	38.8972	13.5091	8428
PPDAT5	10.7184	2.9869	8428
EXPER0	.0384	.1925	8428
EXPER1	.8010	.3992	8428
EXPER2	.1049	.1874	8428
EXPER3	.0126	.1114	8428
EXPER4	.0136	.1160	8428
EXPER5	.0073	.1529	8428
EXPER6	.0169	.1290	8428
EXPER7	.0852	.2284	8428
AGESQ	1596.1884	1143.6816	8428
VAR1021	.5697	.4951	8428
VAR1022	.1689	.3747	8428
VAR1023	.2157	.4113	8428
VAR1024	.0457	.2088	8426
VAR1029	0	0	8428
VAR061BI	.1995	.3996	8428
VAR061M	.7653	.4251	8428
VAR061EE	.0152	.1223	8428
VAR061D	.0113	.1058	8428
VAR061W	.0081	.0895	8428
VAR061NA	.0026	.0507	8428

MALES IN THE PERIPHERY

CORRELATION COEFFICIENTS.

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PPCAT4	-.42203										
PPCAT1	-.28765	.55198									
VAR096	.14369	-.02062	-.00207								
VAR095	.34921	-.15299	-.05501	.18376							
VAR032	.31737	-.46190	-.48092	.01209	.05205						
VAR042	.12259	-.00441	.12642	.01509	.20966	-.24616					
SQVAR042	.02077	.03134	.12843	-.03299	.12577	-.25818	.93715				
NVAR029	.13249	-.04053	.04598	-.05061	.18317	-.25405	.78222	.74332			
PPCAT5	-.18211	.24321	.24434	.00427	-.01571	-.28152	.03096	.02773	.02118		
EXPER0	-.05193	.03736	.01424	-.01845	-.05180	-.03043	.00687	.00674	.02616	.02582	
EXPER1	.15318	-.06486	-.00142	.12277	.22882	.08247	.20245	.12052	-.04513	-.03373	-.44173
EXPER2	.01131	.00088	.01054	-.02969	.01247	-.02041	.15246	.12766	.19601	.00994	-.03804
EXPER3	-.02698	.00275	.00279	.00095	-.01319	.00856	-.01000	-.02172	.00343	-.00116	-.02259
EXPER4	-.03395	.00636	.00667	.00194	-.02403	.01958	-.03990	-.03845	-.03348	.01179	-.02355
EXPER5	-.09223	.01924	-.00978	-.07449	-.13803	.02084	-.08767	-.07137	-.09781	.00375	-.03354
EXPER6	-.08965	.03950	.01756	-.10042	-.18024	-.02723	-.16382	-.09837	-.04049	.01346	-.02627
EXPER7	-.08727	.04076	-.02557	-.07418	-.14750	-.08054	-.30182	-.18123	.02983	.02271	-.04840
AGESQ	.07497	-.01826	.05701	-.07657	.14761	-.25539	.76931	.77030	.98546	.02029	.03388
VAR1021	-.02971	-.11763	-.10480	-.03318	.02873	.11730	.03671	.05070	.07470	-.06816	.00069
VAR1022	-.02442	.05064	.05319	.01497	.00980	-.05596	-.00166	-.00875	-.03613	.04421	.01245
VAR1023	.03151	.06861	.06553	.00943	-.06179	-.09088	-.03806	-.04214	-.05108	.02439	-.01015
VAR1024	.05220	.05292	.03398	.03324	.03602	.00127	-.00910	-.02152	-.01169	.02954	-.00398
VAR1029	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000
VAR0618I	-.29173	.13771	.04196	-.04160	-.25276	.05954	-.34013	-.24026	-.39681	.00068	.03419
VAR061M	.27164	-.12393	-.02756	.05508	.23795	-.05869	.29162	.20053	.33889	.00924	-.02257
VAR0618E	.03530	-.01815	-.01875	.00437	-.00433	.00761	.00426	-.01335	.00558	-.03234	-.01164
VAR061D	-.01491	-.00925	-.02210	-.01148	-.00445	.01428	.02207	.01699	.02092	-.00173	-.01289
VAR061W	-.01124	.03113	-.00478	-.36753	.00567	-.01454	.09738	.11084	.12969	-.00174	-.01258
VAR061NA	-.01202	.01363	.00009	-.00127	.00711	-.00953	.00796	.01345	.01642	.00195	-.00296
	INCOME	PPCAT4	PPCAT1	VAR096	VAR095	VAR032	VAR042	SQVAR042	NVAR029	PPCAT5	EXPER0

MALES IN THE PERIPHERY

EXPER2	-.38127										
EXPER3	-.22633	-.02144									
EXPER4	-.23591	-.02235	-.01327								
EXPER5	-.33605	-.03183	-.01890	-.01970							
EXPER6	-.26316	-.02493	-.01480	-.01542	-.02197						
EXPER7	-.48485	-.04593	-.02726	-.02842	-.04048	-.03170					
AGESQ	-.05297	.16053	-.00262	-.03128	-.08877	-.03502	.03539				
VAR1021	-.00179	-.00085	.00660	-.00336	.00499	-.00292	-.00037	.09082			
VAR1022	.02910	-.01624	-.01367	-.00806	-.00572	-.01424	-.02645	-.03596	-.51878		
VAR1023	-.02510	.01773	.00576	.01070	.00724	.01723	.01506	-.05577	-.60341	-.23644	
VAR1024	.00143	-.00425	-.00245	-.00225	-.01582	-.00145	.01870	-.01727	-.25170	-.09863	-.11472
VAR1029	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000
VAR061SI	-.06306	-.05206	-.01257	.00292	.07073	.06386	.04137	-.33783	.01155	.00531	-.00850
VAR061M	.06088	.04068	.00465	-.00359	-.06246	-.06247	-.04069	.28083	-.02615	-.00031	.01995
VAR061SE	.01550	-.00981	.00118	-.00405	-.00721	.01230	-.00973	-.00398	.03433	-.02245	-.01970
VAR061D	-.00770	.01252	.03276	-.00340	-.00192	.00630	-.00225	.01834	.00170	.00602	-.00020

VAR061W	-.01353	.04324	-.00703	.01638	-.00225	-.00896	-.00094	.14872	.01492	.00445	-.02510
VAR061NA	-.01083	-.00967	-.00574	-.00598	-.00852	-.00667	.04484	.01733	.01545	-.00550	-.00795
	EXPER1	EXPER2	EXPER3	EXPER4	EXPER5	EXPER6	EXPER7	AGESQ	VAR1021	VAR1022	VAR1023

VAR1029	99.00000						
VAR061SI	-.02016	99.00000					
VAR061M	.02323	99.00000	-.89656				
VAR061SE	-.00271	99.00000	-.06201	-.22509			
VAR061D	-.01445	99.00000	-.05341	-.19214	-.01525		
VAR061W	.00606	99.00000	-.04504	-.16204	-.01121	-.00965	
VAR061NA	-.01417	99.00000	-.02529	-.09136	-.00822	-.00644	-.00459
	VAR1024	VAR1029	VAR061SI	VAR061M	VAR061SE	VAR061D	VAR061W

FEMALES IN THE PERIPHERY

VARIABLE	MEAN	STANDARD DEV	CASES
INCOME	3809.1651	2389.7275	3157
PPCAT4	10.7798	2.9933	3157
PPCAT1	11.1715	3.0810	3157
VAR096	35.1254	9.1999	3157
VAR095	40.7045	14.1643	3157
VAR032	10.7222	2.9236	3157
VAR042	10.8296	11.8002	3157
SQVAR042	256.4910	518.3754	3157
NVAR029	37.4914	13.5289	3157
PPCAT5	10.7412	3.0401	3157
EXPER0	.0501	.2182	3157
EXPER1	.4944	.5000	3157
EXPER2	.0859	.2802	3157
EXPER3	.0630	.2430	3157
EXPER4	.0649	.2464	3157
EXPER5	.0869	.2818	3157
EXPER6	.0743	.2623	3157
EXPER7	.0805	.2721	3157
AGESQ	1589.0308	1090.3426	3157
VAR1021	.7392	.4392	3157
VAR1022	.1449	.3521	3157
VAR1023	.1013	.3024	3157
VAR1024	.0142	.1182	3157
VAR1029	0	0	3157
VAR061SI	.2468	.4312	3157
VAR061M	.6424	.4794	3157
VAR061SE	.0357	.1856	3157
VAR061D	.0224	.1480	3157
VAR061W	.0497	.2174	3157
VAR061NA	.0029	.0542	3157

FEMALES IN THE PERIPHERY

CORRELATION COEFFICIENTS.

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	INCOME	PPCAT4	PPCAT1	VAR096	VAR095	VAR032	VAR042	SQVAR042	NVAR029	PPCAT5	EXPER0
PPCAT4	-.36656										
PPCAT1	-.24531	.56090									
VAR096	.28270	.00495	.05795								
VAR095	.40794	-.10903	-.03397	.17839							
VAR032	.20337	-.39893	-.46213	-.04649	-.00693						
VAR042	.19859	-.05938	.02255	.13656	.23313	-.10667					
SQVAR042	.10053	-.02359	.03123	.07429	.14973	-.11770	.92321				
NVAR029	.06532	-.06797	.01212	-.12976	.18131	-.23372	.52909	.46573			
PPCAT5	-.14356	.21026	.23364	.00556	-.00645	-.24691	.02435	.02712	.03369		
EXPER0	-.02559	.02501	.02504	-.01218	-.03722	-.02443	.00614	-.01852	.03827	.01069	
EXPER1	.12275	-.04384	-.03113	.21826	.13729	.05762	.09658	.08775	-.31140	-.03952	-.22712
EXPER2	.05541	-.02531	.01659	-.00300	.07636	-.04098	.29046	.19725	.29959	.03168	-.07040
EXPER3	.06824	-.00884	.01009	-.00415	.07362	.02148	.09450	.02811	.13289	-.00468	-.05955
EXPER4	.02786	.00567	-.02083	-.00824	.04554	.02027	.00360	-.03841	.04216	-.00720	-.06052
EXPER5	-.10325	.00040	-.00485	.00444	-.16178	.01666	-.04521	-.05625	-.03361	-.00321	-.07088
EXPER6	-.14381	-.00065	-.03163	-.28022	-.12117	.02044	-.26006	-.14020	.04598	-.00356	-.06508
EXPER7	-.10550	.09115	.06516	-.11153	-.12372	-.11858	-.27161	-.14643	.06667	.04888	-.06797
AGESQ	.04766	-.00007	.01489	-.11579	.16553	-.22323	.52610	.48258	.98761	.02268	.04010
VAR1021	-.03338	-.12979	-.12462	-.09764	-.04643	.14349	-.01516	-.00824	.05460	-.06586	-.00951
VAR1022	-.00461	.09623	.08113	.03974	-.00602	-.06681	-.02361	-.01834	-.03559	.03801	.02371
VAR1023	.03493	.07437	.08421	.08161	.07821	-.12675	.03518	.02336	-.03991	.06161	-.01511
VAR1024	.04840	.00535	.00594	.03512	-.00963	-.00987	.03666	.02546	.00526	-.01127	.00337
VAR1029	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000
VAR061BI	-.03452	-.00870	-.00579	.16444	-.04522	.13514	-.10345	-.05526	-.37889	-.02570	.00098
VAR061M	.01299	-.00871	-.00178	-.15229	.01101	-.10000	.00981	-.02257	.17363	.05239	-.02243
VAR061BE	-.00535	.01337	.02919	.01906	-.00824	-.00970	.04191	.03137	.06594	-.02925	-.00632
VAR061D	.07715	-.00404	.00413	.04560	.04050	.05562	.05139	.01409	.01516	-.06146	.00091
VAR061W	-.00461	.03046	-.00997	-.04137	.04337	-.07243	.10740	.11753	.29951	-.00508	.04505
VAR061NA	-.01241	-.01069	-.00600	.01477	.00602	-.01894	.02166	.02196	.01034	.02949	.02905

FEMALES IN THE PERIPHERY

EXPER2	-.30307										
EXPER3	-.25833	-.07946									
EXPER4	-.26052	-.08075	-.06830								
EXPER5	-.30512	-.09458	-.08000	-.08130							
EXPER6	-.28015	-.08684	-.07345	-.07465	-.08743						
EXPER7	-.27259	-.09070	-.07671	-.07796	-.09131	-.08384					
AGESQ	-.27894	.29836	.11143	.02111	-.04829	.03655	.06933				
VAR1021	-.03651	.01891	-.00413	-.00060	.00373	.03200	.01957	.05989			
VAR1022	-.04640	.01782	.03621	.01333	-.00951	-.00033	.01367	-.03790	-.69301		
VAR1023	.11200	-.04079	-.04578	-.01500	-.00775	-.03925	-.05137	-.04465	-.56660	-.13856	
VAR1024	-.01268	-.01903	.02463	.00090	.01572	-.01751	.01799	.00461	-.20176	-.04934	-.04034
VAR1029	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000	99.00000
VAR061BI	.30185	-.14217	-.11925	-.13131	-.09152	-.07714	-.01400	-.32303	.01772	-.01581	-.00737
VAR061M	-.20846	.07169	.07625	.08687	.09139	.08592	.00206	.11763	-.06009	.04634	.02925
VAR061BE	-.07032	.03911	.07162	.04090	.01148	-.01114	-.00828	.05897	.04710	-.03154	-.02267

VAR061D	-.00049	.04044	.03573	.05161	-.02450	-.03409	-.03509	.00340	.01517	-.01511	-.01041
VAR061W	-.07842	.05885	.00672	.00243	-.00893	-.00208	.05043	.32605	.04949	-.03482	-.03452
VAR061NA	.00125	.01665	-.01410	-.01433	-.01678	-.01541	.01505	.01074	-.01080	.00486	.01257

	EXPER1	EXPER2	EXPER3	EXPER4	EXPER5	EXPER6	EXPER7	AGESQ	VAR1021	VAR1022	VAR1023

VAR1029	99.00000						
VAR061BI	-.01014	99.00000					
VAR061M	.01037	99.00000	-.76725				
VAR061BE	-.02307	99.00000	-.11017	-.25795			
VAR061D	.01527	99.00000	-.03447	-.20293	-.02914		
VAR061W	.00817	99.00000	-.15095	-.30656	-.04402	-.03463	
VAR061NA	-.00652	99.00000	-.02113	-.07269	-.01047	-.00823	-.01244

	VAR1024	VAR1029	VAR061BI	VAR061M	VAR061BE	VAR061D	VAR061W