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Labour Markets and Sex Differences in Canadian Incomes

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SUMMARY

Using data collected in the Canadian Mobility Study supplement to the July 1973 Statistics Canada Labour Force Survey, this paper examines the income attainments of native born men and women aged 25-64 years who are full-time employees and who worked 35 hours or more per week and 40 weeks or more in 1972. Two models of income determination are examined. The first model regresses income on education and years in the labour force, while the second model includes these variables as well as current and first job occupational statuses.

This analysis into the income attainments of full-time native born employees in the 1973 labour force indicates that the mean income received by women is 62 per cent of that received by males. This income gap almost totally reflects sex differences in the utilization of income relevant characteristics with women receiving lower returns to years in the labour force and to occupational status. Research conducted largely in the United States explores these sex differences in income attainments by examining the impact of core and periphery industrial labour markets, which differ not only with respect to work conditions, job stability and wage levels, but also with respect to the differing rates at which male and female income relevant characteristics are converted into income.

In keeping with such research, this study asks if sex differences in income and in the income attainment processes of

(i)

native born men and women who are employed full time are conditioned by whether they are employed in the core or periphery labour markets. The analysis indicates that:

 such men and women are almost equally distributed into the core and into the periphery industrial sectors of the Canadian economy;

2) sex differences in incomes vary depending on which labour market they are in. The ratio of female mean income to male mean income is lower in the periphery (56 per cent) than in the core (66 per cent); within the core industries the ratio is higher for full-time workers in the public administration industry (70 per cent) than in other core industries (where it is 57 per cent). The analysis suggests that:

3) differential evaluation of characteristics by sex remains a major source of the lower incomes of women within each labour market. The dollar cost of such differential evaluation for women is lowest in the public administration industry, a finding which may reflect the closer and more effective monitoring of sex differences in incomes and occupations in this state controlled sector. In contrast, the dollar cost of the sex specific evaluation for women is highest in the remaining core industrial sector, a finding which theoretically is attributed to the roles which unions and bureaucratic regulations play in preserving male-female inequities in income and career mobility.

(ii)

RÉSUMÉ

A l'aide des données recueillies dans la Canadian Mobility Study, publiée comme supplément à l'Enquête sur la population active de Statistique Canada de juillet 1973, les auteurs du présent document examinent les niveaux de revenu des travailleurs masculins et féminins nés au pays, âgés de 25 à 64 ans, employés à plein temps et ayant travaillé 35 heures ou plus par semaine durant au moins 40 semaines en 1972. Ils étudient deux modèles de détermination du revenu. Le premier effectue une régression du revenu par rapport au niveau de scolarité et au nombre d'années dans la population active, alors que le second inclut ces variables ainsi que le statut professionnel actuel du travailleur et celui qu'il occupait lors de son premier emploi.

Cette analyse de détermination du revenu des employés à plein temps nés au pays et membres de la population active en 1973, indique que le revenu moyen des femmes s'établissait à 62 % de celui des hommes. Cet écart résulte presque exclusivement du fait que les caractéristiques servant à déterminer le revenu sont appliquées de façon préjudiciable aux femmes, de sorte qu'elles reçoivent une rémunération moindre pour les années passées dans la population active et leur statut professionnel. Lors de recherches effectuées en majeure partie aux États-Unis, ces différences de revenu attribuables au sexe sont analysées en examinant l'impact des marchés du travail sectoriels

(iii)

centraux et périphériques. Or, les différences apparaissent non seulement en ce qui concerne les conditions de travail, la stabilité d'emploi et les niveaux de salaire, mais aussi dans les différences de conversion en revenus de ces caractéristiques distinguées selon le sexe.

Poursuivant ces recherches, les auteurs de la présente étude tentent de déterminer si les différences de sexe observées dans le revenu et les processus de détermination du revenu des hommes et des femmes nés au pays et employés à plein temps, tiennent au fait d'être employés dans les marchés de travail centraux ou périphériques. L'analyse indique que :

 ces hommes et ces femmes sont presque également répartis dans les secteurs industriels centraux et périphériques de l'économie canadienne;

2) les différences de revenu attribuables au sexe varient selon le marché du travail. Le ratio revenu moyen des femmes/ revenu moyen des hommes est plus faible dans la périphérie (56 %) que dans le centre (66 %); dans les secteurs du centre, le ratio est plus élevé pour les employés à plein temps de l'administration publique (70 %) que dans les autres secteurs du centre (où il s'établit à 57 %). L'analyse montre :

3) qu'une appréciation différente des caractéristiques selon le sexe demeure l'une des principales raisons du revenu moins élevé des femmes dans chacun de ces marchés. C'est dans l'administration publique que le coût en dollars de cette appréciation différente dans le cas des femmes est le moins élevé.

(iv)

Cette constatation peut refléter le contrôle plus étroit et plus efficace des différences eu égard au sexe pour ce qui concerne les revenus et les professions dans ce secteur régi par l'État. En contraste, c'est dans le reste du secteur industriel central que le coût en dollars de l'appréciation particulière au sexe féminin est le plus élevé. On attribue théoriquement cet état de fait aux rôles que jouent les syndicats et la réglementation bureaucratique dans le maintien des inégalités entre hommes et femmes au plan du revenu et de la mobilité.

I. Introduction

As evinced in the outpouring of research during the past decade, the issue of inequality transcends disciplinary and indeed academic boundaries (see Annals, 1973). This interdisciplinary concern with inequality is especially evident with respect to male-female differences in labour force participation, occupational experiences, and earnings where in recent years both economists and sociologists alike have documented and have sought to explain the lower labour force participation rates of women compared to men, the concentration of women in predominantly female occupations, and the lower earnings of women compared to men. With respect to sex differences in earnings, research in Canada and the United States finds an earnings gap between men and women in the labour force which ranges between approximately 35 and 85 per cent depending on the data set and the research design. In the United States, economic research on the topic of sex differentials in earnings is voluminous, with a partial inventory and summary of findings provided by Kohen, et al. (1977). Sociological analyses of survey data such as the 1967 Parnes study (Suter and Miller, 1973; Treiman and Terrill, 1975a), the 1967 Survey of Economic Opportunity (Hudis, 1976), the NORC General Social Surveys (Beck, et al., 1978b; McClendon, 1976; Roos, 1978), the Occupational Change in a Generation surveys (Featherman and Hauser, 1976) and Current Population Surveys (Beck, et al., 1978a), also investigate the earnings differentials between American men and women. Canadian sociologists only lately have examined sex differences in earnings (Armstrong and Armstrong, 1975), but the lower earnings of women compared to men in the Canadian labour force has been documented by economists such as Gunderson (1976), Holmes (1976); Ostry (1968); Robb (1978); and Tandon and Tandon (1977).

Although the North American research into male-female earnings conclusively documents the existence of an earnings gap in favour of male workers, there is less consensus over the causes of such inequality which persists even when workers are matched in terms of full-time work occupations. Among the factors which are frequently cited as underlying the sex differences in earnings are (Cohen, 1971:435): a) wage discrimination; b) the crowding of women in low paying, low productivity jobs; c) the willingness of women, particularly married women, to trade off lower paying jobs for working conditions more amenable with the performance of wife and mother roles (also see Hudis, 1976; Treiman and Terrill, 1975a); and d) differences in the qualifications of men and women. Both within economics and sociology, a variety of frameworks have emerged which stress the importance of one or more factors to the neglect of others in explaining differences in income.

During the 1960s and early 1970s, human capital theory in economics and the status attainment model in sociology were two such frameworks frequently employed by students of income and occupational inequalities. In recent years, the common focus of both frameworks on worker characteristics as factors underlying income differences has been modified by

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inputs largely from institutional economics. Reflecting the renewed interest in the role which labour markets play in generating income differences, sociologists in particular have incorporated various measures of labour market segmentation in their models of income attainment and in their studies of sex differences in income (Beck, *et al.*, 1978a; 1978b; Bibb and Form, 1977; Hodson, 1978; Roos, 1978; Stolzenberg, 1975). Utilizing data from the 1973 Canadian National Mobility study, this paper adopts this approach and seeks to determine if sex differences in the income of native born full-time employees are conditioned by location in core and periphery labour markets.

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II. Human Capital Theory, Status Attainment Model, and Labour Market Segmentation

As noted above, the origins of the question which this paper addresses arise from a growing dissatisfaction with the explanations of income inequality provided by human capital theory and the status attainment model. This dissatisfaction has stimulated considerable comparisons of the two approaches (Beck, *et al.*, 1978a, 1978b; Bibb and Form, 1977; Horan, 1978; Kalleberg and Sorensen, 1978; Spilerman, 1977) as well as attempts to provide alternative explanatory paradigms.

Although the two approaches share a common concern with explaining the differential distribution of rewards, the problematics of the human capital and the status attainment schools differ. Human capital theory is a subfield of labour economics which emphasizes the distribution of income as an outcome of differences in productivity. Since workers vary with respect to characteristics known to affect productivity and hence income, human capital theory pays particular attention to the relationship between income, education and on-thejob training or experience (see Mincer, 1974), and in so doing, it emphasizes the supply side of the market. Regression models are employed to examine this relationship, with experience most frequently measured as years in the labour force (although theoretically it represents a proxy for productivity related training). Other variables such as occupation or industry frequently appear in these human capital models of income determination because of the need to standardize for their

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effects when comparisons of income determination are made across populations (Oaxaca, 1973; Osterman, 1975; Robb, 1978; Tandon and Tandon, 1977).

In contrast, status attainment research in sociology is an outgrowth of the functionalist perspective on social stratification. The functionalist paradigm stresses that inequality of rewards exists because some positions in a society are valued as more important than others, particularly in terms of ensuring the survival of a society and its members. For example, according to the functionalist theory of stratification, medical occupations have higher incomes than clerical occupations because the former occupations are crucial for the reproduction and longevity of the societal members. Functionalists do not deny that individual productivity differences may affect incomes, but they emphasize income as a reward which accrues to hierarchically ranked occupational positions. Because the distribution of rewards is not always in keeping with the functional importance of social positions, the functionalist model of stratification is also concerned with the interplay between ascribed (race, sex, family of origin, birthplace) and achieved (education, occupation, marriage) characteristics of individuals in accounting for inequality of rewards.

As noted earlier, status attainment research in sociology is an outgrowth of the functionalist perspective on social stratification, and as such, this paradigm investigates the process by which individuals achieve status (Blau and Duncan,

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1967; Duncan, Featherman and Duncan, 1972; Horan, 1978). Sociological research based on the status attainment model stresses the attainment of occupational status, and represents the transmission of status from one generation to another by decomposing the parental-offspring occupational association into a series of intervening life cycle events, notably educational and first job attainments. As a result, status attainment models include a variety of family background variables and stress the role of education in mediating the effects of the family of origin statuses on that of the offspring (Blau and Duncan, 1967; Duncan, Featherman and Duncan, 1972).

Although primary emphasis is given to occupational attainment, the status attainment model has been extended to include income. Initially this income model which derives from status attainment research appears similar to that of the human capital school in methods, emphasis, and variable specification. Both use regression techniques, both include variables such as education and experience, and both examine differences between populations with respect to returns to these worker characteristics. However, the status attainment model focuses upon education as representing the achievement of credentials used to allocate individuals to occupational positions, and it downplays the investment properties of education which human capital theorists stress. (Recent sociological research into income attainment, however, has borrowed the term "human capital variables" from the economic literature and the implied investment properties of education and experience.) Further, although considerable attention is paid to

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the rates of return which individuals receive for their income relevant characteristics in both human capital and status attainment theories, the latter perspective views income not as an outcome of productivity but as a reward which accrues to occupational positions, which individuals have achieved on the basis of family background, education and first job statuses.

Despite the different explanations offered by human capital theory and status attainment research for the distribution of income or earnings, it has become fashionable within sociology to allude to the general similarities between the two perspectives (Beck, et al., 1978a, 1978b; Bibb and Form, 1977; Kalleberg and Sorensen, 1978; Spilerman, 1977). In their pure forms, both frameworks assume a competitive and undifferentiated market. Both human capital theory and the status attainment model do not deny the existence of income inequalities, but hold that income differences between individuals or subpopulations reflect differences in characteristics which are associated with income. Specifically, in a perfectly competitive market, rates of return to income relevant characteristics should be identical across racial, ethnic or sex-defined populations. If incomes do differ, it is due to the compositional differences between groups with respect to their stock of education, and other income relevant characteristics.

Because of the similar views about the nature of the market, and the importance of individual characteristics as factors which underlie the unequal distribution of economic and

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social rewards, both the human capital theory and the status attainment model are subject to similar criticisms. Although a more extensive set of objections exist (see Beck, et al., 1978a), particularly relevant for this paper are two sets of criticisms concerning (1) the model of discrimination employed either implicitly or explicitly by the human capital and status attainment schools; and (2) the de-emphasis of those variables which structure the demand for labour. With respect to the first set of criticisms, both human capital theory and status attainment theory stress that in a world of equal opportunity, the differential distribution of rewards, and hence income, ultimately reflects differences in worker characteristics. Yet a number of economic and sociological studies reveal that income inequalities between men and women exist either despite similar levels of education, and occupation or after adjusting for sex differences in composition where they exist (Featherman and Hauser, 1976; Malkiel and Malkiel, 1973; Oaxaca, 1973; Suter and Miller, 1973; and Treiman and Terrill, 1975a). The lower economic returns which accrue to women compared to men in terms of their educational or occupational characteristics tend to be interpreted as indicating discrimination, with the exact specification of its operation left indeterminate. The "implied attribution" syndrome with respect to discrimination appears to be particularly true of sociologists working within the status attainment paradigm. Beck, et al. (1978a) correctly observed that status attainment researchers have paid little attention to discrimination per se with the result that a coherent theory of discrimination has yet to emerge within that

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school. Human capital research is more explicit in its attribution of discrimination as an explanation for sex differences in income beyond those accountable in terms of human capital characteristics (Aigner and Cain, 1977; Becker, 1957).

Despite the differences in the extent to which group differences in income are explicitly attributed to discrimination, human capital and status attainment research share a common tendency of perceiving residual differences in income which remain after considering compositional differences as reflecting the operation of discrimination. This tendency is highly problematic on several grounds. First, the reference to discrimination is usually an *ad hoc* interpretation of two forms of sex differences in income; a) residual differences in income or b) differential monetary returns to investments in job related and income related skills. Rarely are the data provided or the research conducted which are necessary to determine the various possible sources of discrimination (but see Sawhill, 1973). Secondly, as Sawhill (1973:384-385) and Oaxaca (1973:699) note, the magnitude of the estimated effects of discrimination depends upon variables included as controls in a regression model. In particular, if female productivity is lowered by variables which are not specified in a model of income determination, the gap between men and women with respect to returns to human capital variables such as education and experience may be biased upwards (Roos, 1978; Sawhill, 1973:384-385).

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Although the omission of variables from human capital or status attainment models of income attainment may at first appear to be a methodological issue, it arises from the theoretical conceptualization of income or earnings as a function of worker characteristics. Accompanying this emphasis is a conceptualization of a homogeneous labour market in which workers compete for jobs. In recent years, this emphasis on the supply side of the income attainment process has been criticized by economists and sociologists. Notwithstanding the theoretical gulf between some of the critics (e.g., Bowles and Gintis, 1975; Hodson, 1978; Wright and Perrone, 1977 versus Bluestone, et al., 1973; Stolzenberg, 1975), the criticisms all emphasize the need to consider the existence of multiple labour markets in models of income determination and in studies of income differentials between groups. The literature which stresses segmented labour markets as factors underlying income inequalities is massive, and will be discussed only briefly (see Cain, 1975, 1976; Kalleberg and Sorensen, 1978). As noted by Kalleberg and Sorensen (1978), the impetus for considering labour markets as factors in income inequality arises from at least two sources: (1) the persistence of both poverty and social and economic inequality throughout a decade which stressed equality of opportunity and the eradication of inequality; and (2) a revival of interest in Marxist political economic theory and methodology.

Not unexpectedly there is considerable overlap between the two fields of sociology and economics with respect to the role which occupational and labour market location plays in the

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creation of income inequality between groups in general and men and women in particular. As do economists (Cohen, 1971), sociologists suggest that women earn less than men because they are concentrated and crowded into jobs which are sex typed and which pay poorly (Roos, 1978; Synder and Hudis, 1976; Synder, Hayward, and Hudis, 1978; Treiman and Terrill, 1975b), and because women are less likely than men to be in jobs where authority is exercised over others (Roos, 1978; Wolf and Fligstein, 1977). Although he is not explicitly concerned with explaining sex differences in income, Spilerman (1977:584) charges that status attainment models are insensitive to the fact that changes in occupational status and incomes are to some extent scheduled as a result of career lines. His discussion implies that income differences between men and women are in part the result of career line affiliations, in which women more so than men are concentrated in work settings with poor earnings and status trajectories (Spilerman, 1977:587).

In addition to the concentration of women compared to men into certain types of jobs, the concentration of women into certain sectors of the labour market is also noted by sociologists. Wolf and Rosenfeld (1978) suggest that female occupational status is only minimally affected by employment experience, not only because women cluster in female occupations where career lines are nonexistent but also because they are located in secondary markets. Other researchers observe that the process of wage attainment does indeed differ between labour markets (Beck, *et al.*, 1978a; Hodson, 1978; Stolzenberg, 1975) and that sex differences in earnings are better understood within the context of different labour markets.

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The labour market segmentation literature is replete with models developed by a number of authors, each of whom has added some unique views to its conceptualization. However, labour markets are generally seen as the arena in which workers exchange their labour power for job rewards (Kalleberg and Sorensen, 1978:1). The economic structure is conceived of as consisting of distinct sectors within which workers face fundamentally different conditions and operate under different rules affecting the distribution of workers among jobs and the distribution of wages. Most models of labour market segmentation conceptualize economic sectors as structural entities that derive from the nature of modern industrial capitalism (Beck, et al., 1978a) although there is considerable disagreement between radical and institutional economists as to whether the source of segmented labour markets is endogenous or exogenous to the economic system.

The criteria most often used in order to identify labour market segments include characteristics of occupations, industries, or some combination of both. Piore (1971) was one of the first dual labour market economists to develop a model based on occupational characteristics. He distinguished two markets, a primary and a secondary labour market. The primary market consists of occupations which exhibited the presence of the following attributes: high wages, good working conditions, job stability, equity and due process in the administration of work rules, and opportunities for career mobility (Piore, 1971: 91). The secondary labour market is characterized by occupations exhibiting a general absence of these attributes. This

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model of occupational labour markets has been modified and developed in recent years by Osterman (1975) and Rosenberg (1975) among others. Osterman (1975) divides the occupational structure into primary (upper and lower tiers) and secondary sectors on the basis of such criteria as the level of stability, autonomy, and level of economic rewards associated with various occupational groups. Rosenberg (1975) allocates occupations to the secondary sector if they are low paying, have poor working conditions, high turnover, little chance for advancement, and arbitrary supervision. Otherwise occupations are located in the primary sector.

Other models of labour markets rely not on occupational characteristics as the delimiting criterion but rather on industrial characteristics (see, for example, Bluestone, *et al.*, 1973; Averitt, 1968; Hodson, 1978; Beck, *et al.*, 1978b). Two sectors of the economy are generally distinguished and labelled as core and periphery sectors or as monopoly and competitive sectors. The core sector consists of industries noted for high productivity, high profits, capital intensitivity, and a high degree of unionization. Industries in the periphery sector are noted for their small firm size, labour intensitivity, low levels of unionization and low profits.

Still other models of labour markets have relied on characteristics of both occupations and industries in order to identify labour market sectors. Freedman (1976) and Andrisani (1973) used annual earnings to identify occupational-industrial cells. Following Rosenberg (1975), Hodson (1978) includes in his model both primary and secondary occupational sectors as well as state, monopoly, and competitive industrial sectors.

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All of these labour market models, whether based on occupational and/or industrial criteria, are used by researchers interested in the role of labour markets in the earnings determination process. This type of research provides a structural explanation for income differences and is particularly useful in the explanation of sex differences in earnings.

Of particular interest to this study is the research on the impact of industrial labour markets on the income attainment process. A persistent finding in this research is that industrial labour markets have significant effects in earning regressions, net of human capital variables (Beck, *et al.*, 1978a, 1978b; Bluestone, *et al.*, 1973; Hodson, 1978; Wachtel and Betsey, 1972). Although there are significant differences in labour market composition and economic status between core and periphery labour markets, sectoral differences in earnings cannot be explained away by differences in labour market composition (Beck, *et al.*, 1978a, 1978b; Hodson, 1978).

Beck, et al. (1978a) are particularly concerned with sex discrimination in earnings arising from the differential allocation of men and women to core and periphery labour markets in the United States and the differential evaluation of their human capital within these labour markets. Theoretically central to their study is the evaluation of a dual economy which has different manpower requirements for the core and periphery sectors. The core sector requires a work force that is trainable and stable while the periphery sector requires a work force that is willing to accept inferior work conditions, lower

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wages and a higher risk of work instability. Beck, et al. (1978a) argue that these labour force requirements underlie two discriminatory mechanisms affecting the occupational and income attainments of minorities such as blacks and women. First, there is a differential allocation of minorities to labour market sectors and second, there is a differential evaluation of workers' human capital within labour market sectors depending on race or sex. Both of these discriminatory mechanisms result in the inferior economic and social status of minorities in the labour force. Beck, et al. (1978a) present several arguments to suggest that "while there is a differential evaluation of human capital within both sectors, such differential evaluation is a more important component in the core sector than in the periphery". The core sector largely consists of highly bureaucratized firms exhibiting a wider range of occupations and incomes than is evident in the periphery sector. Within both sectors employers may allocate minority workers (e.g., women) to less desirable jobs on the basis of minimizing risk and uncertainty. But, the relative costs of such occupational segregation may be expected to be substantially greater in the core than the periphery sector because of sectoral differences in unionization and bureaucratic structures. Although unionization is more extensive in the core than in the periphery sector, historically unions have tended to represent the interests of white male labour to the detriment of female workers (Beck, et al., 1978a:9). Further, within the core sector the presence of formalized regulations governing promotions, such as seniority rules, may act as an

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effective mechanism for slowing or curtailing the mobility of women. The preceding arguments, then, suggest that although there is a differential evaluation of the human capital of males and females within both sectors, the economic costs for women as a consequence of this differential evaluation are greater in the core than in the periphery sector. In keeping with these arguments, Beck, *et al.*, analyze United States Current Population Survey data and find that: (1) men have a higher probability of being in the core sector; (2) men have more favourable dollar returns to human capital variables than do females; (3) the costs of being in the periphery are greater for males than females; (4) and the costs of the differential evaluation for women's human capital are greater in the core than in the periphery sector (Beck, *et al.*, 1978a).

Overall, these findings of Beck, et al. (1978a) and others (Bibb and Form, 1977; Hodson, 1978) concerning the differential allocation of men and women to labour markets and the differential evaluation of the education and experience within these markets suggest the need to consider labour market location in any comparison of male-female income attainments. Accordingly this paper investigates Canadian sex differences in income utilizing a model of income attainment which includes core-periphery location. The model of income attainment employed is theoretically grounded in the status attainment models of sociologists, and in keeping with this approach, this study examines the extent to which sex differences in income reflect sex differences in characteristics and/or differences in the rates of return which men and women receive for their educational

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attainments, years in the labour force, first and current occupational statuses. In addition, the paper asks if coreperiphery location adds to our understanding of the income attainment process in general and it examines how sex differences in rates of return to income relevant variables vary according to labour market location.

III. Data and Methodological Considerations

Sex differences in income are investigated in this study with data from a national survey conducted to investigate the intergenerational occupational mobility of the Canadian population. This Canadian National Mobility study was funded by a Canada Council research grant, and it involved the assistance of Statistics Canada which arranged to distribute an eight-page questionnaire as a supplement to their July, 1973 Labour Force Survey (for further details, see Boyd and McRoberts, 1974). These questionnaires provide information on background characteristics (parental education, paternal occupation, family of orientation size and structure; urban-rural origins, respondent's education, first job and current occupational status) for nearly 45,000 non-institutionalized respondents aged 18 years and older. The study is similar to the 1962 and 1973 Occupational Changes in a Generation surveys conducted in the United States (Blau and Duncan, 1967; Featherman, Hauser and Sewell, 1974) in that it is designed to examine the effect of familial socioeconomic origins, particularly paternal occupational status, on the educational and occupational achievements of the offspring. But, notwithstanding this focus, the study includes questions on frequency of labour force interruptions, years spent in the labour force, income earned in the preceding year (1972), and on hours and weeks worked in the preceding year. Because Statistics Canada also made available the Labour Force Survey data on respondents who had answered the Canadian National Mobility questionnaire,

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additional data on respondents exist with respect to a variety of 1973 labour force characteristics, ranging from class of worker, full- or part-time work, to occupational and industrial classifications of the job held by the respondent.

Although social and economic data are available for Canadian non-institutionalized residents aged 18 and over, this paper investigates the income attainments of a more restrictive population, notably native born men and women aged 25-64 who were in the July 1973 labour force as full-time employees, and who had worked 40 weeks or more and 35 hours or more during 1972 which was the preceding year for which income was reported. This sub-population was selected for study for a number of reasons. First, persons who were between 18 and 24 in age or 65 and over were omitted because they represented a selective sub-population compared to the larger age group from which they are drawn. Persons 18 to 24 who are in the labour force are less well educated than their peers who frequently are not in the labour force because they are attending postsecondary schools or universities. Conversely, men and women who continue their labour force involvement past 65, which is the usual age of retirement, generally are better educated than their retired counterparts and hold jobs such as the selfemployed professional occupations, which are more amenable to continued labour force participation. Only native born men and women are included in the income attainment analysis because research suggests that the occupational and income attainment experiences of foreign born workers differ enough

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from that of native born Canadians to warrant a separate analysis (Boyd, 1976; Li, 1978; Richmond, 1967; Tandon and Tandon, 1977).

The additional selection of full-time employees who worked 40 or more weeks and 35 hours or more in 1972 is made for two reasons. First, it permits comparisons of men and women, holding constant the type of labour force involvement. At the same time however, this decision to consider only the full-time employees oversimplifies the complex nature of female labour force participation since it ignores the experiences of native born women who are in the July labour force as self-employed; it also ignores part-time workers, and unpaid family workers who have no earned income. Because parttime work is more characteristic of women than men and because such work partly accounts for the lower earnings of women relative to men, normally the excluded population of self-employed and part-time should be kept in the analysis. However, the Canadian National Mobility study data suffers from very high rates of non-response for the workers in the excluded categories. As shown in Table A, Appendix I, 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 aged 25-64 and 20.0 and 42.0 per cent for females respectively. Rates of non-response for paid, self-employed and unpaid family workers were 12.6, 17.9 and 36.5 per cent for males and 22.1, 36.4 and 71.5 per cent for females, respectively. Not only are these

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very high item non-response rates but also the non-response is very selective. Analysis of a 10-category occupational classification provided by the 1973 Labour Force survey to which the Canadian National Mobility questionnaire was attached shows that non-responses for part-time and self-employed workers are disproportionately from the farming and service occupations.

The high rates of non-response of the self-employed, part-time or family workers to the question on current occupation is problematic for any investigation into the effect which occupational status has upon income attainment. Simply put, the analysis which includes only those part-time or selfemployed respondents for whom occupational data are available risks biasing the analysis of income attainments, particularly if those persons who are deleted from the analysis have very different occupational and income distributions. The problem of biasing results by including the entire labour force when occupational data exist for only a portion of the work force is compounded by the fact that the location of respondents into the core-periphery sectors also requires knowing the occupations of the respondents. (The methodology for constructing the typology is discussed later in this section and in Appendix II.) Again, an analysis which includes those part-time and/or selfemployed workers for whom occupational data exist runs the risk that any effects of core-periphery location on income attainment may be misleading since a selective portion of the population who did not give their occupations are omitted from the analysis. In sum, the high non-response rate and selectivity of

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responses to the occupational question for workers, especially women, in self-employment, part-time or unpaid family work makes questionable the utility of including such workers in an analysis of sex differences in income and constitutes the second reason for the focus on the full-time employees in the native born labour force.

Of course, the decision to examine income attainments of native born full-time employees is not without consequence. A comparison can be made of the socioeconomic characteristics of men and women divided into three groups of (1) not in the labour force; (2) in the labour force as full-time employees, and (3) other workers in the labour force including part-time, self-employed and/or unpaid family workers. Such a comparison of the group specific socioeconomic characteristics reveals that compared to other workers, full-time employees have higher mean incomes, occupational status and education, and they are more likely to be full-time workers in 1972, in the core sector of the Canadian economy and in clerical, professional or managerial occupations (Table B, Appendix I). For women, full-time paid employment is particularly selective of women not currently married. Two-thirds of the women in full-time paid work are married compared to 85 per cent in part-time work and 90 per cent of those women who are not in the labour force.

These comparisons of the sub-population included in the analysis and those excluded indicate that although the fulltime employee population constitutes the majority of the labour force population, it constitutes a select group of workers.

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This selectivity in turn removes some sources of male-female differences in income from the analysis. As a result, the analysis of sex differences in income is conservative with respect to the magnitude of sex differences in income and with respect to sex differentials in the income returns to the variables discussed below.

Since education, years spent in the labour force, and occupational status, and core-periphery location are major variables in the analysis of sex differences in income, a brief consideration of their measurement is warranted. Education is derived from an 18-category classification, and in this paper it is scaled to approximate years of schooling (see Appendix I, Table C). Years-spent-in-the-labour-force data are based on a question concerning the number of years which the respondents had spent in the labour force full time since beginning their first full time job. The specification of full-time employment in the question no doubt underestimates the total amount of time spent in the labour force, but this underestimation is somewhat counterbalanced by the instructions which directed respondents to consider as a full year any year in which they had worked seven months or more. Given the budgetary constraints of the study and the space constraints of the questionnaire, the resulting data on years spent in the labour force are not as accurate as information from occupational life history studies (Parnes, et al., 1970). But, probably the information is a more realistic indicator of the years of labour force participation than is a frequently used and frequently criticized proxy measure which is calculated from age minus education and minus five years.

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As discussed in the preceding section, students of the status attainment model depict income attainment as an extension of the model of occupational attainment. As such, income is viewed as a reward which an individual receives on the basis of his or her occupational, and other income related statuses. In this study, occupational status is measured in Blishen scores (Blishen and McRoberts, 1976) which, like the Duncan (1961) socioeconomic index (S.E.I.) scores used in much of the United States research, are considered to be socioeconomic scores of occupations. Derived as they are from education and income characteristics of occupations, the usefulness of these scores for the examination of occupational attainment in general, and for comparisons between men and women more specifically, has been hotly debated. Critics of the scores have argued that the inclusion of education in deriving the scale underlies the centrality of education as a variable mediating between the occupational statuses of father/parent and offspring. A related criticism, pertinent to studies of income attainment is that the derivation of the score from education and income data predetermines its importance in any analysis of income. These criticisms appear based on a confusion of group attributes versus individual characteristics. The education and income data are group characteristics used to assign scores to occupations. Blau and Duncan (1967:124-128) have shown that the score assigned does not change appreciably if education is removed as a component of the score. Furthermore, in their income attainment research, Treiman and

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Terrill (1975a:182) use prestige scores but note that their results are unaltered if Duncan S.E.I. scores are used (but see Hauser and Featherman, 1977, Chapter 1).

Such research suggests that the inclusion of educational and income components in deriving the overall occupational status scores does not contaminate analyses based on this measure. A more relevant concern is what the scores actually represent. Recent research indicates that the resultant hierarchy of occupations based on socioeconomic scores closely corresponds to the perceived "goodness" of an occupation -- a goodness which is evaluated in terms of the socioeconomic attributes and desirability of the occupation in question (see Featherman and Hauser, 1976; Goldthorpe and Hope, 1972). Thus, theoretically, analyses comparing men and women with respect to income returns to occupational status measure returns to occupations ranked in terms of their general socioeconomic standing. By virtue of the occupational metric used, such analyses do not, and cannot, directly measure the effect of other aspects of the occupational structure such as sex segregation and reduced mobility opportunities due to jobs with truncated career lines (see Spilerman, 1977). Sorensen (1978) suggests that the Duncan S.E.I. scale is relatively insensitive to sex segregation, and he proposes an alternative scaling strategy and theory of attainment.

As noted in the preceding section, a variety of criteria are used to delineate labour markets more generally and core-periphery sectors more specifically. Core and periphery

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industries generally are defined by economists according to such criteria as the labour/capital ratio, productivity, unionization, scale of production and scope of market product (see Bluestone, et al., 1968; Edwards, et al., 1975; Averitt, 1978; O'Connor, 1973) and the basis for the creating of a coreperiphery typology range from a univariate to a multivariate approach (Tolbert, et al., 1978). In this paper, concentration ratios provided by Marfels (1978) are used to locate industries into either the core or the periphery labour markets, and a more detailed account of the considerations and procedures is provided in Appendix II. In addition to using the concentration scores, the core-periphery typology is based on reassigning workers in mining and some workers in selected industries. Further, workers in education, social work and health occupations are assigned to the Public Administration industry (see Appendix II). Some writers maintain that the Public Administration industry should be included as a separate and third sector, the state sector, in the core-periphery framework (Hodson, 1978; O'Connor, 1973). However, it also can be considered a core industry, and it is treated initially as such in this paper. The resulting classification closely follows that of Beck, et al. (1978b) and thus it differs slightly from the typologies created by Bibb and Form (1977) and Hodson (1978).

Data on 1972 income is derived from the following question which appears in the Canadian National Mobility survey: "What was your income (before taxes) from employment

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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. In light of the presumed sensitivity of the question, the non-response rates for men and women who comprise the population under investigation in this paper (fulltime employees in 1973 who worked 40 weeks or more and 35 hours or more a week in 1972) were encouragingly low -- ranging between 5 and 9 per cent. Comparisons of the distribution of responses with the income data gathered for the same population in the 1971 census also suggest that the accuracy of response was fairly high (allowances were made for temporal shifts in the 1970 and 1972 distributions). Most problematic for the analysis is the categorical nature of the income data gathered by the Canadian National Mobility study. The obvious solution is to use a known income distribution to generate income values for each category. Because 1971 census data was readily available from the Public Use Sample Tape of Individuals, median incomes for each category corresponding to the precoded categories were calculated for male and female full-time employees in the 1971 census who had worked 40 weeks or more and 35 hours or more in 1970. However, the original intent to preserve the sex-specific differences within a category median incomes, proved untenable in light of the very small numbers of women in the Public Use Sample who met the population criteria and who had incomes in excess of \$13,000 (see Table D, Appendix I). Instead, category-specific median income for the total population

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was used to assign a dollar value to those respondents who indicated their employment income fell in a given category. For the most part, the actual male-female differences in median income, specific to the categories used in the Canadian National Mobility survey, are small (Table D, Appendix I). If the procedure of relying on the median income of the male and female population combined has any effect, it biases the results in the direction of minimizing male-female differences.

No allowances were made for increases in the value of the dollar in the two-year period between the 1970 income data of the 1971 census and the 1972 income data reported in the Canadian National Mobility Study (the Consumer Price Index between 1970 and 1972 increased by 1.07). In addition, because the analysis focused upon the incomes of the full-time wage earners, persons who indicated they were full-time wage earners in 1973 but reported a 1972 income net loss were deleted from the analysis. Those few persons (approximately .5 per cent) reporting a zero income were assigned an income of one dollar.

The decision to focus the analysis upon the full-time employee population and the need to assign a dollar value to categorical income data appear to be factors which mitigate the need to transform the income distribution when used as a dependent variable in a regression analysis. It has become almost standard, particularly in human capital research, to take the natural logarithm of income and to express the relationship of income and human capital variables as a semi-logarithmic function (see Beck, *et al.*, 1978a; Stolzenberg, 1975; Mincer, 1974).

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This transformation is based on the theory of human capital and the resultant use of the Taylor series expansion. Such a transformation is not demanded by the status attainment school except for interpretative or methodological reasons (see Featherman and Hauser, 1978, Chapter 5). In fact, such a transformation resulted in a much lower explanatory power of the independent variables than when income remained untransformed. Subsequent analysis revealed that such a semi-logarithmic transformation did indeed distort what was a linear relationship between income and occupation. Although these results appear surprising in light of the voluminous amount of research which examines income attainment as a semi-logarithmic function, it must be remembered that the selection of a full-time employee population and the use of grouped income data minimize the analytical impact of those individuals who have unusual incomes in relation to their human capital skills and occupational statuses.

The method of analysis used to examine the income attainments of men and women is regression. The metric coefficients produced with this technique indicate what is the magnitude of change in the dependent variable (income) for a unit change in a given independent variable, controlling for other variables. Whether a given variable is considered statistically significant depends on the ratio of the metric coefficient to its standard error. Generally, with large samples, the standard error is quite small. The Canadian National Mobility Study has a very large sample which can be inflated to represent the

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larger Canadian population. Such inflation means that all relationships between income and the independent variables will be statistically significant. In this paper, this possibility is handled by a weighting system which permits the data to be representative but constrains the numbers to those of the original sample by downweighting the representative population by a factor of 1/320. Further, metric coefficients are not considered to be substantively interesting or statistically significant unless they are more than twice their standard errors. Because of the interest in comparing male-female models, a listwise deletion procedure is used in the regression analysis since it permits testing across populations to determine if sex differences in metric coefficients and intercepts are indeed significant by use of the increment in R^2 test (Cohen, 1968; Gujarati, 1970). Appendix III discusses further the terminology and methods of male-female comparisons conducted in this paper.

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IV. Basic Models of Income Attainment and Sex Differences in Income

As discussed earlier, the analysis focuses upon the income attainments of men and women in the 1973 Canadian native born labour force who are full-time employees with 1972 income and who worked 35 hours or more and 40 weeks or more in 1972. The data in Table 1 show the existence of considerable sex differences in income with men in 1972 receiving an average income from work of \$9,932 and women receiving an average income of \$6,151. As outlined in the previous sections, the fact that female full-time employees on the average earn only 62 per cent of the mean income earned by their male counterparts is frequently attributed to sex differences in variables known to affect incomes as well as to sex differences in the returns which men and women receive to these income relevant characteristics. But, as shown in the first two columns of Table 1, it cannot be said unequivocably that women on the average are disadvantaged by their stock of human capital skills and by their occupational statuses since compared to men, women have similar levels of mean educational attainments and higher mean first and current occupational status scores.

The implication that sex differences in characteristics do not account for the sex differences in income is substantiated by the results of the regression analysis, also appearing in Table 1. Two models of income determination are analyzed. Although various functions expressing the relationship of education and experience to income exist in the literature (Beck, *et al.*, 1978a; Blinder, 1973, 1976; Mincer, 1974;

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CHARACTERISTICS AND MODELS OF INCOME ATTAINMENT OF FULL-TIME WAGE EARNERS, 40 OR MORE WEEKS IN 1972, BY SEX, CANADA 1973 AGE 25-64, WHO WORKED 35+ HOURS PER WEEK,

(5.787) (6.067) (26.981) (19.482) (.478) .416 66.686 32.388 -1.519 293.367 108.917 -3,177.593 Females 1 (9) 1 Metric Coefficients and Standard Errors Model II (4.832) (5.053) (20.105) (17.746) (.379) -6.218 .343 33.988 -4,030.043 105.455 333.922 359.665 Males 11 (2) I I (21.250) (.514) (20.958) 589.576 -1.960 -2,140.759 .321 128.603 Females (4) 111 111 Model (16.165) (18.796) (.402) 684.926 -6.283 .254 -1,801.408 367.177 Males (3) -111 (.500) (12.439) (12.210) (2.581) (9.555) 388.495) . 524 11.800 45.590 327.517 48.191 15.371 (2,724.00) Females 6,151.30 Standard Deviations (2) 1 1 Means and .477 (13.606) (3.403) (.500) (13.972) (11.172) (517.265) 46.452 39.841 11.124 20.603 549.278 (4,574.80) 9,932.00 Males (1) 1 11 Years in the Labour Force, Years in the Labour Force Current Occupation, Variables Blishen Points Blishen Points Core Location, Proportion 1972 Income First Job, Squared Intercept Education R2

The Canadian National Mobility Survey. Source:

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Stolzenberg, 1975), both models depict education as linearly related to income and as having effects on income which operate independently from the effects of experience. As noted by Hansen and Weisbrod (1973), experience can be conceptualized in a number of ways; the models depicted in Table 1 define experience in terms of years in the labour force, and express the relationship between years of labour force participation and income as a curvilinear one in 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 depicted by including the term (years in the labour force), which together with the linear representation of experience represents the relationship between experience and income.

Although both the selection and the functional form of the independent variables in Model I are found in human capital research, they are augmented in sociological research by the inclusion of occupation as a status to which income rewards accrue. Because income is a function of occupation it is not surprising that the inclusion of first job and current occupational statuses in Model II increases the explained variation in income from 25 to 34 per cent for males and from 32 to 42 per cent for females (Table 1).

The results of regressing the 1972 income of fulltime native born employees on the variables contained in Models I and II tell a familiar story which appears in other Canadian research into sex differences in income (Gunderson, 1976; Robb,

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1978). Canadian men and women differ in income earned from work in part because men and women obtain different rates of return on some income relevant characteristics. Depending on the model employed (Table 1), the increment of R² test (Cohen, 1968; Gujarati, 1970) reveals that the metric coefficients for the effect of education (Model I), years in the labour force and the decay term (Models I and II), and current occupation (Model II), differ significantly for men and women (Appendix I, Table E) with women receiving lower returns when differences exist.

The decomposition of differences in means technique (Althauser and Wigler, 1972; Winsborough and Dickinson, 1971) also indicates that women are disadvantaged compared to males in how socioeconomic characteristics are utilized in the income attainment process, and it shows that the small benefit which women derive from having slightly higher education, first and current job statuses does not overcome this disadvantage. This technique decomposes the actual difference in mean income of \$3,781 between men and women into that attributable to differences in composition, differences in regression equations and a portion which reflects the interaction between the two components of income differences (see Table 4, column 1). As discussed by Althauser and Wigler (1972), Winsborough and Dickinson (1971) among others, these results indicate that relative to their current mean income of \$6,151, if women had the same set of mean characteristics as men, women would lose \$268 in average annual 1972 income based on Model II. But if women had their own characteristics and utilized them in the same way as

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did males, that is, according to the male specific regression equation of Model II, women would increase their mean income by \$3,883 (Table 4, column 1). In short, full-time native born paid employees who are women earn less than men because they do not benefit from their income relevant characteristics in the same manner as men.

V. The Impact of Core-Periphery Location on Income Attainments

As reviewed in the introduction to this paper, a number of explanations exist for the above finding that women have lower incomes than men because they are not as efficacious as men in utilizing their socioeconomic characteristics to attain income, even when type of employment and hours and weeks worked are held constant. Beck, *et al.* (1978a) suggest that differential core-periphery location with differential evaluations of characteristics between sectors as well as between men and women within sectors are all factors which contribute to sex differences in incomes in the United States. This section examines whether such factors underlie sex differences in income in Canada as well.

Examination of the full-time paid native born labour force data for Canada reveals that worker characteristics differ according to location in the core or in the periphery sectors. For each sex, mean incomes, occupational statuses, and educational attainments are higher in the core sector than in the periphery sector (Table 2, columns 1 and 2 versus columns 3 and 4). Since worker characteristics, including income, vary across the core and periphery sectors, the suspicion occurs that male-female income differences in part reflect the differential location of men and women into core and periphery sectors with males tending to locate in the more remunerative core sector of the economy and women tending to locate in the less remunerative periphery sector. However, the data do not support this argument. If anything, full-time paid females are

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Table 2

CHARACTERISTICS AND MODELS OF INCOME ATTAINMENT OF FULL-TIME WAGE EARNERS, AGE 25-64, WHO WORKED 35+ HOURS PER WEEK, 40 WEEKS OR MORE IN 1972 BY SEX AND CORE-PERIPHERY LOCATION

							Metric Coe	fficients a	nd Standard	Errors		
	Mean	is and Stand	ard Deviati	Suo		Model]				Mode.	1 II	
	CO	lre	Peri	phery	Cor	9	Per	iphery	Col	e	Peri	phery
1 - F - F	Male (1)	Female (2)	Male (3)	Female (4)	Male (5)	Female (6)	Male (7)	Female (8)	Male (9)	Female (10)	Male (11)	Female (12)
	10,268.4	6,838.3 (2,835.9)	9,625.7	5, 395.3 (2, 377.6)	man			-				
states Points	49.093 (14.316)	51.949 (11.412)	44.046 (13.200)	44.056 (12.216)	-		1		97.503 (6.664)	63.052 (8.038)	116.302 (7.135)	68.512 (7.962)
The job. Elisten	41.518 (14.233)	49. 189 (11.518)	38.313 (12.822)	41.629 (11.720)			1		29.854 (6.854)	31.271 (8.476)	38.820 (7.427)	20.309 (8.252)
de se an	11.430 (3.433)	12.504 (2.315)	10.846 (3.351)	11.026 (2.637)	694.739 (22.446)	774.361 (31.908)	658.870 (23.332)	364.409 (28.441)	358.587 (28.719)	502.710 (39.484)	310.383 (28.107)	122.594 (35.046)
wers in the Labour	20.317 (11.148)	14.172 (8.969)	20.864 (11.190)	16.691 (10.001)	376.540 (26.374)	186.626 (29.496)	357.682 (26.814)	91.213 (28.584)	391.140 (25.008)	162.654 (27.716)	323.494 (25.279)	69.986 (26.733)
Mars in the Labour	536.997 (506.117)	281.196 (342.211)	560.463 (527.048)	378.494 (428.217)	-6.373 (.574)	-3.077 (.770)	-6.180 (.566)	-1.110 (.667)	-6.792 (.543)	-2. Å93 (.723)	-5,551 (,532)	747 (.623)
idei anas	1	-	-	-	-1,900.112	-4,623.690	-1,627.467	274,874	-4,155.712	-5,865.201	-3,988.902	-705.640
~	-	-			.272	.411	.234	.195	.352	. 484	.332	. 302
		and the second s										

Warthen the Canadian Mational Mobility Survey.

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slightly more likely than men to be employed in the core sectors of the economy, with 52 per cent of the female workers in the core compared to 48 per cent of the males (Table 1, columns 1 and 2).¹ These near even distributions of both men and women across the core-periphery sectors are found in Hodson's (1978) study of United States. Using the 1977 General Social Survey of the National Opinion Research Center, Beck, *et al.* (1978b, Table 1) finds 61 per cent and 71 per cent of female and male United States workers are in the core.

Although the near equal distributions of males and females across the core and periphery sectors in Canada indicate that the differential location of men and women into the coreperiphery sectors does not account for income differences, other questions remain to be answered. A general question arising largely from the work of the institutional economists is whether or not income relevant characteristics are differentially evaluated in the core and the periphery sectors. A second question asks if the sex differences in rewards which individuals receive on the basis of their education, occupational statuses and years of labour force participation are sharper in the core than in the periphery.

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¹ Although full-time paid native born men and women are comparable with respect to their core-periphery distributions, the possibility remains that the processes of allocation to the core or periphery sectors differ by sex, thereby indirectly affecting sex differences in income (see Beck, et al., 1978a). This paper does not test for such a possibility.

The data on mean incomes by sector (Table 2, columns 1, 2, 3 and 4) and on the effect of core location on income indicate that core-periphery location has an insignificant substantive impact on the incomes of full-time paid males, but a larger effect on the incomes of females, net of variables such as education, occupational statuses and years in the labour force (Table 2, columns 9, 10, 11 and 12; and Appendix I, Table E). The average income for females in the core is \$1,443 greater or 26.7 per cent larger than the mean income of women in the periphery. In comparison, the average income of full-time paid native born men in the core sector is \$642 greater, or 6.7 per cent higher than the mean incomes of the men in the periphery. The regression analyses tell a similar story. A detailed comparison between the models of income attainments of males in the core and in the periphery show that there is no statistically significant core-periphery difference in the evaluation of income relevant characteristics for males (Appendix I, Table E). These findings are surprising in light of the empirical studies in the United States which have observed differential returns to human capital skills across core-periphery labour markets (Beck, et al., 1978a, 1978b; Bluestone, et al., 1973). The findings for the Canadian data may well reflect the conservative nature of the comparison, which is based on full-time paid workers only and omits those self-employed and part-time workers who tend to concentrate in the periphery. Further, the finding of differences is methodologically attenuated by the reliance on grouped income data which reduces the income variability.

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However, core-periphery differences in the conversion of socioeconomic characteristics into income do exist for paid full-time native born females in Canada. Sorensen (1973) cautions against the use of cross sectional data to infer the effect of a variable which changes over time, such as labour force experience, but the data in Table 2 suggest that for women in the periphery the relationship between years in the labour force and income is better described as an almost flat, linear function rather than as the curvilinear relationship which holds for males in both sectors and to a lesser extent for women in the core. Tests for interaction (Appendix I, Table E) show that women in the core receive higher return for years spent in the labour force and for their educational attainment as compared with women located in the periphery industries. In addition, the test for differences in intercepts indicates that there is a significant effect of being in the core as compared to location in the periphery net of these differential returns to education and labour force experience.

Overall location in the core has a more favourable impact on the income attainments of women than does location in the periphery. This impact again can be shown by decomposing the difference in mean incomes earned by women in the core and periphery. According to this decomposition, women in the periphery would gain \$772 if they had their own sector specific way (Model II) of converting socioeconomic characteristics into income, but they had the characteristics of women in the core sector. If women in the periphery had their own set of

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characteristics, but the model of income attainment (Model II) of women in the core, they would gain \$134. This analysis suggests that although core-periphery differences exist with respect to the utilization of income relevant characteristics, the compositional differences between women in the core and in the periphery account for a greater share of the income gap.

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VI. Core-Periphery Location and Sex Differences in Income
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Thus far the analysis of the income attainments of native born full-time paid workers indicates: (1) the existence of differences between males and females with respect to income and socioeconomic characteristics, (2) the existence of some sex differences in the income returns to those characteristics; (3) the existence of differences between core and periphery workers with respect to income and socioeconomic characteristics, with the differences in income being the greatest for female workers; and (4) evidence that income relevant characteristics are differentially evaluated across the core and periphery sectors, but only for female workers. This section combines this attention paid to sex differences in income attainment and to core-periphery differences in income attainment by asking if sex differences in the returns which individuals receive on the basis of their education, occupational statuses and labour force experience are greater in the core than in the periphery. Such differences are expected to the extent that unionization and bureaucratization, which are more prevalent in the core industries, operate in favor of male occupational and income attainments.

The question concerning the extent of sex differences in income returns within the core and within the periphery initially can be answered by comparing the regression models of income attainment for men and women in the core (Table 2, column 5 vs. column 6; and column 9 vs. column 10) and for men and women in the periphery (Table 2, column 7 vs. column 8; and

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column 11 vs. column 12). The tests for interaction for Model I indicate that men and women in the periphery differ in the returns to their socioeconomic characteristics with women getting less of a return. Men and women in the core differ with respect to the years in the labour force variables and intercepts (Appendix I, Table E). If a model of income attainment including occupational statuses is used (Model II), the same conclusions are reached with respect to sex differences with two important modifications. First, although men and women differ with respect to the direct effect of current occupational status on income, men and women in the core do not differ in their returns to first job, net of occupation. Given that current occupation mediates much of the influence of first job on income, this finding is not surprising. More surprising however, is the second finding that the sex differences which exist in returns to the educational attainment of core workers are such that women compared to men receive a higher rate of return, net of other variables. As indicated in Table 2, (Model II, columns 9 and 10), women in the core receive \$503 for each year of education whereas men receive \$359 or a difference of \$144 per year of education, net of other variables.

This higher rate of return to education for women compared to men contradicts the expectation that women in the core should be disadvantaged compared to males because of the roles which unions and bureaucratic regulations play in preserving male-female inequities in income and career mobility (Beck, *et al.*, 1978a; Piore, 1971; Spilerman, 1977; Wolf and Rosenfeld, 1978). However, this contradiction is resolved by remembering

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that in this analysis the core industrial sector includes the public administration industry (Humphreys, 1979), which differs from other core industries in the extent to which the workers there are either employed or regulated by the State sector. In Canada, monitoring of sex inequities in the private sector is relatively weak, particularly in comparison to the equal opportunity legislation which the United States government has enacted and to which private industries must respond (Bennett and Loewe, 1975).

This discussion concerning the differences between the public administration and other core industries is important because of the differential allocation of men and women into the public administration industry. Of the native born fulltime paid workers included in the analysis, 12.6 per cent of the males and 25.9 per cent of the females are in the public administration industry, and of the workers in the core sector 30.5 and 57.6 per cent of the males and females respectively are in the public administration industry. In short, the data indicate that the different income attainment models for men and women in the core reflect in part the differential concentration of men and women in the public administration industry where male-female income difference may be more attenuated relative to those existing in other core industries.

Table 3 shows this to be the case. The ratio of female mean income to male mean income is 56 per cent in the periphery, 66 per cent in the core (Table 2), but 70 per cent in the public administration industry compared to 57 per cent

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Table 3

CELELTTERISTICS AND MODELS OF INCOME ATTAINMENT OF FULL-TIME PAID NATIVE BORN WORKERS, AGE 25-64, WHO WORKED 35+ HOURS PER WEEK, 40 WEEKS OR MORE IN 1972 BY SEX AND LOCATION IN PUBLIC ADMINISTRATION OR OTHER CORE INDUSTRIES

	3						Metric Coe	efficients à	and Standard	Errors			
			NATO LEVIAC	IONS		Mode	el I			Model	I II		
	Pub.	lic Strattm	Core W Pub Adminis	hithout lic tration	Ldu Adminini	ic tration	Core Pub Admini	Without 01ic stration	Publ Ndminis	ic tration	Core W Publi Administ	ithout ic ration	
/ariable	Male (1)	Fendle	Male (3)	Female (4)	Male (5)	Female (6)	Male (7)	Female (8)	Male (9)	Female (10)	Male (11)	Female (12)	
1972 Income	11,010.2	7.0.2	9,908.7	5,680.8 (2,003.2)	-	-			-				-
Jurrent Occupation	54.563 (14.067)	54-273	46.441 (13.673)	48.922 (11.050)	-				80.092 (12.063)	85.480 (12.420)	107.602 (8.002)	37.354 (9.067)	45
first Job	46.704 (15.996)	52,223	39.003 (12.549)	45.021 (10.535)	an an an		-		45.812 (11.756)	10.756 (12.596)	18.745 (8.569)	28.236 (10.178)	-
ducation	12.887 (3.569)	13.256 (11.256	10.724 (3.131)	11.560 (2.110)	826.634 (38.465)	924.893 (45.391)	626.689 (29.415)	365.451 (43.639)	479.905 (52.622)	638.088 (55.075)	318.201 (34.668)	206.722 (50.691)	
fears in the Labour Force	19.095 (11.395)	11.742	20.909 (10.981)	14.346 (8.643)	481.950 (43.604)	217.886 (37.312)	335.188 (33.057)	101.433 (41.291)	495.157 (41.967)	186.738 (34.970)	345.826 (31.092)	99.038 (39.689)	
fears in the Labour Force, Squared	494.320 (500.313)	261.34f	557.690 (507.751)	280.322 (328.522)	-8.935 (.972)	-4.097 (.974)	-5.338 (.710)	-5.781 (1.081)	-9.019	-3.229 (.914)	-5.811 (.688)	649 (1.039)	
ntercept	I		-		-4,428.482	-6,418.920	-843.549	162.878	-6,681.366	-7,634.166	-3,221.816	-1,046.663	
2	I	1	-		• 359	.463	.221	.230	.417	.536	.313	. 295	
										In this and this and any style was the fact way and they			

Source: The Canadian National Mobility Survey.

in the remaining core industries (Table 3). Further, a comparison of the metric coefficients reveals that with respect to education, women obtain higher rates of return to their education if they are located in the public administration industry than if they are found in other core industries. Since women are more concentrated in the public administration industry compared to men, these higher rates of return account for the earlier finding that women in the core have a higher rate of return to education compared to men (Table 2, columns 9 and 10).

In addition to indicating why women in the core have a higher rate of return than men to their education, net of labour force experience, and occupational statuses, the data in Table 3 reveal additional differences concerning the income attainments of native born full-time paid men and women in the core. With the exception of returns to the years in the labour force terms, the income attainment process does not differ for male and female workers in the public administration industry (Appendix I, Table E). Tests for interaction indicate that compared to women, males in the other core industries get a higher return to their labour force experience (Model I, Model II), educational attainment (Model I) and current occupational status (Model II), (Appendix I, Table E).

Overall, several findings emerge from the above analysis of male-female income differences within core-periphery sectors. First, across all industrial sectors considered (core and periphery; public administration and other core industries), full-time paid native born women get lower rate of return to

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their years in the labour force compared to men. For women in the periphery and in the core industries excluding the public administration industry, the decay term is insignificant, indicating that for these women the relationship between labour force experience is a gently rising linear function rather than the more steeply rising and curvilinear function which holds for men irrespective of their sector location and for women in the public administration industry (But see: Sorensen, 1973, who cautions against this type of interpretation).

A second finding of the above analysis is that compared to men, women in the periphery and in the core receive lower rates of return to their current occupational status. Results concerning returns to education, net of experience, first job and current occupational statuses, are more mixed and lead to a consideration of men and women in the public administration industries apart from workers located in other core industries. The third finding which emerges from this consideration is that compared to workers in other core industries or in the periphery, men and women in the public administration industry are more likely to have similar rates of return to their education and current occupational status. This latter finding is particularly interesting since it occurs in the state funded and monitored sector of the Canadian economy.

These findings suggest income relevant characteristics are differentially evaluated for men and women within both the core and the periphery sectors. Further, the cost in dollar

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terms of this differential evaluation is greater for workers in the core than in the periphery, a finding which parallels research results in the United States (Beck, et al., 1978a). This can be shown most easily by using the sex and sector specific regressions appearing in Table 2 (columns 9-12) and in Table 3 (columns 9-12) to calculate the expected incomes which an individual with a given set of characteristics will obtain depending on the sex and core-periphery location of the person. For example a person with a current occupational status score of 45, a first job score of 40, 11 years of education, and 18 years in the labour force would obtain an income of \$10,173 if male and working in the core sector compared to an income of \$6,029 if female and working in the core sector.² These substitutions of fixed characteristics into regression equations for Model II indicate that the difference between the incomes of a man and a woman who have the identical socioeconomic characteristics given above except for sex, would be \$4,680 in the periphery, \$4,048 in the public administration industry and \$4,602 in the remaining core industries. A number of examples generated with this technique show that the actual magnitude of the dollar costs vary depending on the characteristics chosen to substitute into the equation, but in general, the dollar costs to women of the differential utilization of their income

² Examples of occupations with a Blishen-McRoberts score of 40 are a) Supervisors, Apparel and Furnishings Service Occupations; b) Foremen, Wood Machining Operations; c) Tellers and Cashiers. Examples of occupations with scores of 45 are: a) Foremen, Textile Processing Occupations; b) Typesetters and Compositors; c) Typists and Clerk Typists.

relevant characteristics are lowest in the public administration industry and highest in the remaining core industrial sector.

That sex differences in the utilizing of socioeconomic characteristics cost Canadian women the most in actual dollars if they are located in the core sector excluding the public administration industry also is evident when the sex differences in mean income specific to industrial core-periphery location are decomposed to components representing: a) sex differences in socioeconomic characteristics, b) differences in the way in which men and women utilize their characteristics in obtaining income, and c) the residual difference (Althauser and Wigler, 1972; Winsborough and Dickinson, 1971). Table 4 summarizes the results of this decomposition for both Models I and II of income attainment and for the periphery and core sectors, with the latter divided into the public administration industry and the remaining core industrial sector. Irrespective of which model of income attainment is used, the data in Table 4 clearly show that differences in the socioeconomic characteristics of native born full-time paid men and women account for very little -- in the range of 5 per cent -- of the male-female income differences found in each industrial sector. Most of the sex differences in income specific to each sector arise from the fact that men and women differ in how these characteristics are utilized in obtaining income, with women usually receiving lower rates of return when male-female differences in metric coefficients exist (Tables 2, 3 and 4). Table 4 also provides an estimate of this cost to women, specific to each sector since the component due to differences in equations is calculated by substituting

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Table 4

DECOMPOSITION OF MALE-FEMALE DIFFERENCES IN INCOME, FOR NATIVE BORN FULL-TIME PAID WORKERS, AGE 25-64, WHO WORKED 35 HOURS PER WEEK OR MORE AND 40 WEEKS OR MORE IN 1972, BY MODEL OF INCOME ATTAINMENT AND CORE-PERIPHERY LOCATION

			Core-Periphe	ry Location	
			Core		Periphery
Model and L Decomposition	Total	Total	Public Administration	Other Core Industries	
Model I ²					
Mean Income Gap (Male-Female)	\$3,781	\$3,430	\$3,310	\$4,228	\$4,230
Amount due to.					
Composition	- 161	- 472	- 65	208	- 437
Equation	3,716	3,493	3,038	4,032	3,983
Interaction	226	409	337	- 12	684
Model II ³					
Mean Income Gap (Male-Female)	3,781	3,430	3,310	4,228	4,230
Amount due to:					
Composition	- 268	- 598	25	34	- 137
Equation	3,883	3,657	3,104	4,216	4,076
Interaction	166	371	181	- 22	291

1 For a description of the technique, see Althauser and Wigler (1972), and Winsborough and Dickinson (1971).

2 Model I regresses income on education, years in the labour force, and a decay term for years in the labour force.

3 Model II regresses income on education, years in the labour force, a decay term for years in the labour force, first job occupational status and current occupational status.

Source: Tables 1, 2 and 3.

the mean characteristics of women into the male equation and then subtracting the known female average income (see Appendix III). This procedure is equivalent to asking by how many dollars would the average income of women increase if their mean characteristics did not change, but if they converted these mean characteristics into income according to the income attainment models of males. Comparisons of this hypothetical gain in income across various core-periphery sectors shows that the amount of income foregone to women because they differ from men in the process of income attainment, is lowest in the public administration industry (\$3,104 using Model II) and highest in the other core industries (\$4,216 using Model II). In keeping with the Beck, et al., (1978a) study in the United States, the data in Table 4 show that dollar costs for women of the sex differences in income attainment processes are higher in the core sector, excluding the public industry, compared to the periphery sector.

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VII. Concluding Comments

The results of this study both confirm and extend the findings of earlier investigations into sex differences in Canadian incomes. The analysis into the income attainments of full-time paid members of the 1973 Canadian native born labour force indicates that the mean income received by women is 62 per cent of that received by males. This income gap almost totally reflects sex differences in the utilization of income relevant characteristics, with women receiving lower returns to years in the labour force, and current occupational status. Research conducted largely in the United States explores these sex differences in income attainments by examining the differential allocation of males and females into various industrial sectors which differ not only with respect to work conditions, job stability and wages, but also with respect to the evaluation of male and female income relevant characteristics. In keeping with such research, this study asks if sex differences in income and in the income attainment processes of native born full-time paid men and women are conditioned by location in core and periphery labour markets. The analysis indicates that: (1) such men and women are almost equally distributed into the core and into the periphery industrial sectors of the Canadian economy; (2) the income attainment process of male workers in the core does not differ from that of male workers in the periphery, whereas female workers in the core industries receive a higher rate of return for their years in the labour force and education when compared to females in the periphery; (3) differential evaluation of characteristics by sex remains a major source of

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the lower income of women within labour markets. However, the extent of income discrepancy and the impact of such differential evaluation varies by core-periphery location.

Although the analysis presented here focuses on the relationship of industrial labour markets and sex inequities in income, there is considerable evidence to suggest that a model of labour markets which includes both industrial and occupational dimensions may add further insights into our understanding of such inequities (Freedman, 1976; Hodson, 1978). Research by Doringer and Piore (1971) and others suggests that internal labour markets are more highly developed in the core than in the periphery sector and that women are less likely than men to benefit from these internal labour markets both because within the core sector these internal labour markets function to insulate male and female labour pools and facilitate the segregation of women into clerical and service occupations which offer few promotional opportunities. Further studies of male-female income inequities should not only consider the role played by industrial labour markets but also the effect of internal labour markets which take account of career trajectories (Humphreys, 1977; Spilerman, 1977).

Notwithstanding the need for more focused research, the results of this paper indicate that differential evaluation of the characteristics of men and women exist in the core and periphery, with the dollar cost of the differential being the smallest in the public administration industry, and the largest for workers in the core industry sector (excluding the public

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administration industry). Sociologists frequently interpret such differentials as indicating the existence of discrimination, with its operation left indeterminate. Although the exact nature of discrimination cannot be specified with the data used in this paper, at least two findings of this study support the interpretation that women are disadvantaged relative to men in obtaining income. First, the analysis shows that sex differences in worker characteristics do not account for the income gap which exists between native born full-time paid men and women. Secondly, the income gap, measured as a ratio of mean female income to the average income of males, is narrowed to 70 per cent of that of males in the public administration industry. This relatively narrowed sex differential in income may be indicative of closer and more effective monitoring of sex differentials in incomes in this industry as compared with other core industries. It may also reflect the fact that women in the public administration industry are highly concentrated into professional and clerical occupations and the structure of these occupations is such that sex differentials in incomes are minimized by the effects of unionization and professional associations. Clearly, further research is required, however, before the relatively low sex differences in incomes in the public administration industry can be fully understood.

These explanations, however, have several policy implications. First, the standard ameliorative policies of upgrading human capital skills, which were stressed by North American social scientists in the 1960s, will have little impact on closing the income gap between native born full-time paid

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men and women in Canada. Secondly, to the extent the narrower income gap and the greater similarity of male-female income attainment process in the public administration industry reflect the monitoring of the state, the data suggest that sex disparities in income will attenuate in Canada only when stronger legislation regulating the private sector is enacted. Further, the fact that the mean income of full-time paid native born women in the public administration industry is only 70 per cent of that of males indicate the need for further action in this industry. What kind of legislation should be enacted in the public and private sectors of the economy is subject to considerable debate; minimum wage legislation is seen as ineffective (Bluestone, et al., 1973) as are equal pay laws in the absence of other legislation (Sawhill, 1973). In her discussion of the United States, Sawhill suggests that the optimal strategy may well be one of a well enforced equal opportunity legislation combined with equal pay legislation.

In addition to the role played by state monitoring, the lower income differentials in the public administration industry may also reflect the nature of occupational organization in this industry. Women are highly concentrated by occupation in this industry. These female dominated occupations, particularly the professions (e.g., nursing and teaching) and clerical work, are monitored by both unions and professional associations and it is likely that these organizations act in the interests of their members in reducing sex differentials in incomes. The joint effects of state and occupational monitoring may well operate to more effectively eradicate male-female

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income differences in the public administration industry as compared to other core industries or periphery industries. This would suggest that ameliorative action concerning male-female income inequalities will not only entail the strategies proposed by economists concerning governmental expenditures in core and periphery industries (Bluestone, *et al.*, 1973), but also may require a more active intervention on the part of unions, governments and occupational associations in the establishment and monitoring of equal pay and equal opportunities policies. APPENDIX I

Supplementary Tables

Table A

NON-RESPONSE RATE TO CURRENT OCCUPATION IN THE CANADIAN NATIONAL MOBILITY SURVEY BY LABOUR FORCE CHARACTERISTICS AND SEX, CANADIAN LABOUR FORCE, 1973

Characteristics	Males	Females
Part Time, Full Time		
Full Time Part Time	12.7 20.6	20.0 42.0
Class of Worker		
Paid Worker Self Employed Unpaid Family Worker	12.6 17.9 36.5	22.1 36.4 71.5
Labour Force Status		
Full Time Paid Other Worker	11.7 26.3	17.6 43.1

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		Males		F	emales	
	In Labour	r Force		In Labou	r Force	
Characteristics	Full Time Wage	Other	- Not in Labour Force	Full Time Wage	Other	- Not in Labour Force
Numbers in 000's	2,816	692	223	1,032	466	2,392
Per cent	75.5	18.5	6.0	26.5	12.0	61.5
Means and Standard Deviations						
1972 Job Earnings ^(a)	8,398 (5,340)	5,820 (6,441)	na na	4,581 (3,370)	1,949 (2,639)	na na
Years in Labour Force	20.4 (11.4)	21.9 (12.0)	27.0 (12.5)	13.7 (9.5)	10.4 (8.9)	8.0 (7.0)
Current Job, Blishen Points	45.0 (14.2)	37.5 (15.4)	na na	46.7 (12.8)	42.6 (11.8)	na na
First Job, Blishen Points	38.9 (13.6)	35.3 (14.4)	34.3 (12.5)	44.7 (12.6)	41.8 (12.1)	41.1 (12.6)
Respondent's Education	10.6 (3.6)	9.8 (3.8)	7.7 (4.1)	11.4 (2.9)	10.6 (3.0)	9.8 (3.3)
Age	41.1 (11.1)	43.8 (11.9)	52.8 (10.6)	40.8 (11.3)	42.0 (10.8)	42.9 (11.6)
Per cents						
Marital Status	100.0	100.0	100.0	100.0	100.0	100.0
Single Married Other	9.3 88.2 2.5	13.9 83.5 2.6	21.1 69.6 9.3	20.4 65.6 14.0	6.0 85.1 8.9	3.1 90.0 6.9
Hours Worked Per Week, 1972	100.0	100.0	100.0	100.0	100.0	100.0
<20 27-34 35 plus	.4 2.5 97.1	1.9 7.0 91.1	11.7 3.6 84.7	2.8 10.0 87.2	24.9 36.8 38.3	21.2 17.9 60.8
Weeks Worked, 1972	100.0	100.0	100.0	100.0	100.0	100.0
0-26 27-39 40 plus	6.8 4.6 88.6	20.6 6.7 72.7	76.2 5.8 18.0	17.5 5.6 76.9	49.1 6.9 44.0	90.2 2.4 7.4
Core Periphery Location ^(b)	100.0	100.0	na	100.0	100.0	na
Core Periphery	45.8 54.2	18.5	na na	49.2	28.8	na na

Table B SOCIOECONOMIC CHARACTERISTICS OF NATIVE BORN CANADIANS, AGE 25-64, BY SEX AND LABOUR FORCE STATUS, CANADA 1973

Table B continued...

Industrial Sector	100.0	100.0	na	100.0	100.0	па
Agriculture	.9	33.4	na	. 4	11.1	ла
Logging, Fishing, Trapping	4.7	3.6	na	. 3	.3	na
Manufacturing, Durable	15.1	3.8	na	6.3	2.0	na
Manufacturing, Non-durable	13.9	3.7	na	12.4	4.6	na
Construction	8.8	11.9	na	1.1	1.9	na
Transportation	14.7	6.3	na	5.2	3.6	na
Whole Sale, Trade	6.4	3.7	na	3.5	2.3	na
Retail	8.5	12.9	na	11.8	24.3	na
Finance, Insurance, Real Estate	3.3	2.2	па	7.8	4.2	na
Community and Recreation	8.8	6.3	па	32.5	19.7	па
Personal Services	1.8	4.5	na	7.3	18.1	na
Other Services	3.3	4.8	na	4.4	4.7	na
Public Administration	10.8	2.9	na	7.0	3.2	na
1971 Census Occupational	100.0	100.0	па	100.0	100.0	na
Categories						
Managers and Administrators	9.9	1.9	na	4.8	1.4	na
Professional, Semi Professional	11.4	7.9	na	24.3	14.1	na
Clerical	7.6	2.5	na	38.3	29.5	па
Sales	10.9	14.5	na	6.8	16.2	na
Services	7.9	7.2	na	12.7	22.3	na
Farm, Fishing, Logging	3.0	36.8	na	. 3	11.2	na
Mining, Quarry	11.3	4.6	na	3.5	. 8	na
Production, Fabrication Assembing	11.8	5.3	na	6.6	2.6	na
Transportation Crafts	14.6	11.2	na	2.5	1.9	na
Construction	11.6	8.1	na	. 2		na

(a) Income categories were coded to the midpoint values, with the exception of the categories for loss of income and incomes of 20,000 plus which were assigned values of -\$4,000 and \$26,000 respectively.

(b) Core-periphery data given only for those persons reporting an occupation in the Canadian National Mobility Survey. Non-response rates are high for the other worker category. See Appendix I, Table A.

(na) Not applicable.

Source: The Canadian National Mobility Study

Ta	b	1	е	С	
			-		

RESPONSE CATEGORIES AND CODES FOR EDUCATION VARIABLES

Categories	
No formal schooling	1
Elementary school	
Some	4
Completed	8
High school	
Academic	
Some	10
Completed	12
Vocational or technical	
Some	10
Completed	12
After high school but not university Business or trades training: (e.g., secretarial schooling, hairdressing school, barbering school, trade school, etc.) Some Completed	12 13
Nursing school or Teacher's College	
Some	12
Completed	13
Community College, Junior College, CEGEP,	
lechnical Institute	17
Completed	13
	2 '
University	
Some	14
Completed:	14
Bachelor's degree	16
Master's degree	19
Doctorate	19
Professional degree (e.g., M.D., L.L.B.,	
C.A., etc.).	18

Table D

NUMBERS AND MEDIAN 1970 EARNINGS^(a) FOR FULL-TIME CIVILIAN WORKERS IN 1971 WHO WORKED 40 WEEKS OR MORE AND THIRTY-FIVE HOURS OR MORE IN 1970, BY SEX

	Num	ber of	Cases	Median	1972 Ear	mings ^(a)	
	Total	Male	Female	Total	Male	Female	Male-Female Differences in 1972 Median Incomes
1972 Earnings Categories ^(a)							
Loss	37	33	4	-1,780	-1,620	-5,570	3,950
1 - 1,999	501	275	226	1,200	1,199	1,201	- 1
2,000 - 2,999	814	336	478	2,500	2,500	2,511	- 11
3,000 - 3,999	1,677	779	898	3,501	3,511	3,500	11
4,000 - 4,999	2,192	1,350	842	4,450	4,500	4,370	130
5,000 - 5,999	2,593	2,050	541	5,401	5,421	5,340	81
6,000 - 6,999	3,019	2,602	417	6,411	6,441	6,337	104
7,000 - 7,999	3,067	2,763	304	7,380	7,380	7,345	35
8,000 - 8,999	2,358	2,180	178	8,370	8,370	8,315	55
9,000 - 9,999	1,783	1,713	69	9,380	9,381	9,339	42
10,000 - 10,999	1,400	1,335	65	10,209	10,201	10,298	- 97
11,000 - 11,999	707	671	36	11,310	11,303	11,405	- 101
12,000 - 12,999	588	565	23	12,139	12,136	12,330	- 194
13,000 - 13,999	355	344	11	13,299	13,298	13,350	- 52
14,000 - 14,999	271	260	11	14,223	14,218	14,300	82
15,000 - 15,999	267	258	9	15,107	15,098	15,500	- 402
16,000 - 16,999	176	169	7	16,202	16,203	16,050	153
17,000 - 19,999	268	263	5	18.002	18,002	19,078	-1,076
20,000 plus	448	438	10	25,001	25,001	24,164	837

(a) Wages and Self Employment

Source: Statistics Canada. 1971 Census of Canada. Public Use Tape of Individual, Entire Count.

Table E

SIGNIFICANCE LEVELS FOR TESTS FOR INTERACTION FOR MODEL I AND MODEL II OF INCOME ATTAINMENTS, BY SEX AND CORE-PERIPHERY LOCATION

				Variables and	l Intercept		
Tab. com	le, columns of comparison, groups being pared and level of significance of eraction tests(a)	Current Occupational Status	First Job Status	Education	Years in the Labour Force	Decay Term	Intercept
Table 1:	Model I, columns 3 vs. 4 (males vs. females)			.025	.0005	.0005	. 75
	Model II, columns 5 vs. 6 (males vs. females)	.0005	.75	.50	.0005	.0005	. 25
Table 2:	Model I, columns 5 vs. 7 (core males vs. periphery males)		8	.50	. 75	06.	. 75
	Model I, columns 6 vs. 8 (core females vs. periphery females)		1	.0005	.025	.10	.0005
	Model II, columns 9 vs. 11 (core males vs. periphery males)	.25	.50	.10	.10	.25	06.
	Model II, columns 10 vs. 12 (core females vs. periphery females)	. 75	.50	.0005	.025	.10	.0005
Table 2:	Model I, columns 5 vs. 6 (core males vs. core females)		-	.25	.005	.025	.005
	Model I, columns 7 vs. 8 (periphery males vs. periphery females)			.0005	.0005	.0005	.025
	Model II, columns 9 vs. 10 (core males vs. core females)	.025	06.	.05	.0005	.001	.05
	Model II, columns 11 vs. 12 (periphery males vs. periphery females)	.005	.50	10.	.0005	.0005	.0005
Table 3:	Model I, columns 5 vs. 6 (public administration males vs. females)	8 9 8		. 25	.0005	.01	.10
	Model I, columns 7 vs. 8 (remainder core males vs. females)	1	-	.01	.01	.05	. 50
	Model II, columns 9 vs. 10 (public administration males vs. females)	06.	. 25	.10	.0005	.0005	.50
	Model II, columns 11 vs. 12 (remainder core males vs. females)	.0005	. 75	. 50	.005	.025	. 25

(a) Based on increment to R^2 tests (see Cohen, 1968; Gujarati, 1970).

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APPENDIX II

Construction of an Industrial Labour Market Classification for Canada

by Elizabeth Humphreys Department of Sociology, Carleton University
1. Methodological Considerations

Core and periphery industries are generally distinguished by economists according to such criteria as labour/ capital ratio, productivity, unionization, market concentration, scale of production, and scope of product market (see Bluestone, 1970; Edwards, et al., 1975; Averitt, 1968; O'Connor, 1973). Of course each of these criteria distinguishing the competitive conditions of an industry are not of equal importance. It is generally recognized that the key market attributes are the degree of market concentration, the condition of entry into the industry and the degree of product differentiation (see English, 1969; Rosenbluth, 1969; Mueller, 1970). Of these key attributes, "market concentration serves as a proxy of other structural barriers, particularly condition of entry" (Mueller, 1970:17).

Aggregate statistics on the market concentration of Canadian industries have recently been released by the Royal Commission on Corporate Concentration (RCCC) (1978). These data consist of industrial concentration ratios which reflect the fraction of activity or stock of productive resources (i.e., assets) accounted for by a group (generally four) of the largest firms in a given industry.

Since the RCCC has compiled the most recent data on industrial concentrations and since these data are presented in the form of concentration ratios, it is important to be alert to the advantages and disadvantages of these ratios. The advantages in using these concentration ratios include computational convenience, ease of interpretability, historical

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continuity and international comparability (RCCC, 1978:32). There are several limitations, however, which are inherent in concentration ratios: (1) two industries with different industrial structures could have the same four-firm concentration ratio; (2) concentration ratios fail to reflect the regional character of certain markets (e.g., construction); (3) concentration ratios do not reflect the degree of import competition in industries. The latter limitation is possibly the most serious for comparative research since Canada is more open to international trade than most industrialized countries.

For the purposes of this research concentration ratios are utilized simply to categorize industries into two nominal categories, core and periphery economic sectors, rather than to locate industries along an ordinal scale of competitive market conditions. The distortions created by using concentration ratios to categorize industries are therefore lessened. While it is clear that concentration ratios are subject to some methodological limitations, they do provide an adequate basis for locating industries into either the core or periphery labour market.

Unfortunately economists have no clear convention for establishing a classification of industries into core/periphery economic sectors on the basis of industrial concentration ratios. This study relies on a slightly revised version of the most recent and most comprehensive Canadian classification established by Marfels (1978:80) for the Royal Commission on Corporate Concentration. Marfels' classification is based on three

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criteria: (1) 4-firm concentration ratios (assets); (2) 100firm concentration ratios (assets); (3) measure of inequality of assets. Although Marfels distinguishes high, medium and low levels of industrial concentration, for the purposes of this study it is sufficient to distinguish high and low levels of industrial concentration. Table A provides the data and the cutting points on the basis of which industries were located into either the core (high concentration) sector or the periphery (low concentration) sector.

Manufacturing industries are more difficult to classify in that they exhibit considerable variation in the degree to which they operate within a concentrated market. Based on Statistics Canada's measurement of the importance of the leading four enterprises' share of an industry's shipments, Table B provides a rank order of manufacturing industries by concentration level. A manufacturing industry is located within the core or periphery sector depending on whether its concentration level is greater than or less than 50.00 respectively.

The final industry to be considered is that of public administration. This would include government administrators and their administrative bureaucracies, the military, the domestic police force, and the judiciary. In addition, since teachers, medical workers, and social workers are regulated by the state in terms of their wages and working conditions, they are also included in the public administration industry.

On the basis of the preceding discussion, a classification of industries into the core or periphery sectors is presented in Table C.

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Table A							
INDUSTRIAL	CATEGORIES	BY	ECONOMIC	SECTOR			

	_	Cutting Points					
Criteria	F	Periphery	Sector	(P)	Core	Sect	or(C)
A = average asset size of all corporations (\$M)		1.	. 35			1.3	8
<pre>S = shares of assets accounted for by the 4 largest corporations</pre>		16	5			16	
L = shares of sales accounted for by the 4 largest corporations		1:	3			13	
I = levels of inequality in the distribution of assets (1973)			1			4	
Industry	A	S		L		I	Sector
Agriculture, Forestry, Fishing Mining Manufacturing Construction Utilities Trade Finance Services	.26 5.22 2.48 .35 4.80 .44 2.20 .27	(P) 6.8 (C) 20.4 (C) 8.9 (P) 5.7 (C) 39.2 (P) 10.4 (C) 33.2 (P) 4.6	(P) 1 (C) 1 (P) 0 (C) 20 (P) 0 (C) 20 (P) 0 (C) 20 (P) 0 (P) 0 (P) 0 (P) 0 (P) 0 (P) 0 (P) 0	3.3 (P 7.4 (C 5.5 (P 1.8 (P 5.0 (C 5.3 (P 5.2 (C 3.0 (P) 8) 3) 4) 6) 1) 5) 2) 7	(P) (C) (C) (P) (C) (P) (C) (P)	P C/P* P C P C P

* Manufacturing industries display a wide range of levels of concentration. The category on manufacturing industries must be disaggregated before they can be assigned to either the core or periphery sector.

Source: C. Marfels, <u>Concentration Levels and Trends in the Canadian</u> <u>Economy, 1965-1973</u>, Study No. 31 for the Royal Commission on <u>Corporate Concentration</u>.

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Ta	bl	e	B

MANUFACTURING INDUSTRIES BY CONCENTRATION LEVEL

Core Sector	Concentration Level*
Petroleum and Loal	//.6/
Primary Metal	74.36
Mineral Products Non Metallic	72.28
Transportation Equipment	57.67
Textile	57.62
Electrical Products	55.46
Food and Beverage	50.41
Periphery Sector	
Chemical and Chemical Products	40.33
Miscellaneous Manufacturing	40.00
Paper and Allied Industries	35.78
Machinery Industries (except electrical)	32.34
Metal Fabricating (except machining and transport equipment)	30.27
Leather	29.32
Wood	28.18
Printing and Publishing	24 05
Knitting Mille	16 27
Furniture and Firtures	15 7/
Clathing	10.74
Clothing	14.43

* Concentration levels are measured by the leading four enterprises' share of industry's shipments.

Source: Statistics Canada, Industrial Organization and Concentration in Manufacturing, Mining and Logging Industries, 1968, pp. 20-21.

Table C

CLASSIFICATION OF CORE AND PERIPHERY SECTORS

Core Sector -- High Concentration Industries

Utilities, Transportation, and Communication Finance, Insurance, and Real Estate Mining Public Administration Manufacturing I

Periphery Sector -- Low Concentration Industries

Trade Construction Personal, Business, Community Services Agriculture, Forestry, and Fishing Manufacturing II

2. Core-Periphery Classification of the Canadian National Mobility Survey

The data available from the National Mobility Survey include the Blishen-McRoberts (1975) scores, a somewhat collapsed version of the two digit SIC codes as well as CCDO codes for respondents current occupation. The following modifications to the data were necessary in order to locate industries into either the core or the periphery sector:

(a) The SIC codes for manufacturing industries had been collapsed into Manufacturing - Durable and Manufacturing - Non-durable categories, which were too aggregated for the purposes of a core/ periphery industrial classification. Workers in manufacturing occupations listed below were categorized into the appropriate economic sector.

Core Manufacturing

Mineral Oil Metal Processing Clay, Glass and Stone Processing Petroleum, Rubber and Plastic Food, Beverage and Related Textile Processing Fabricating, Assembling, Installing, Repairing, Electrical, Electronic Fabricating, Rubber, Plastics

Periphery Manufacturing

Wood Industries (except pulp and paper)
Pulp and Papermaking
Chemical Industries
Other Processing
Metal Machining
Metal Shaping and Forming (except machining)
Wood Machining
Clay, Glass and Stone Machining
Other Machining
Fabricating and Assembling Metal Products, NEC
Fabricating, Assembling and Repairing Wood Products
Fabricating, Assembling, Repairing Textiles, Fur, Leather
Mechanics and Repairmen, except electrical
Other Product Fabricating, Assembling, Repairing, Occupations

(b) Workers in education, social work and health occupations were identified in the National Mobility Survey as being employed in the industrial category for service workers. These occupations, whose wages and working conditions are controlled by the state, more properly belong in the Public Administration Industry. Therefore, workers in those occupations corresponding to CCDO codes of 2331 to 2349, 2711 to 2799, 3111, 3130 to 3139 and 3155 were assigned to the Public Administration category in the core sector. (c) Mining was originally included in the industrial category -- Agriculture, Forestry, Fishing and Trapping. Since mining is a core industry, all workers in mining occupations (corresponding to CCDO scores 2153, 7710 to 7719, and 9195) were assigned to the mining industry.

3. Core-Periphery Classification and Type of Worker in the Canadian National Mobility Study

The consequences of the allocation procedures described above are shown in Table D, which compares the core-periphery typology with a crude typology based on reclassifying the two digit SIC industrial categories. A comparison of the second and third panels of Table D indicates that the major difference between the two typologies arises from classifying female workers in health, education and social worker occupations into the public administration industry and hence into the core sector. With this reassignment, slightly over two-fifths of the native born women in the labour force who gave their current occupation are in the core sector compared to one-fourth when the crude industrial typology is used (Table D, column 4, panels 2 and 3).

Because of the high rate of non-response to current occupation for workers other than full-time employees (see Appendix I, Table A), it is not possible to assign all respondents who were in the Canadian National Mobility survey to a labour market according to the core-periphery typology used in this paper. A comparison of panels 1 and 2 in Table D which are based on crude two digit SIC industrial typology indicates that if occupational data were available for all labour force participants, there would be a slight increase in the proportion of workers located in the periphery sector.

As discussed in the text, the high rate of occupational non-response for part-time, self-employed and/or unpaid family workers, particularly among women, led to the decision to focus the analysis on labour force participants who were full-time wage earners in July 1973. Table D (columns 2 and 3; 5 and 6) shows that this sub-population selection removes from analysis a group of workers who are more likely to be in the periphery. Given the theoretical bases of the core-periphery typology, this is hardly surprising. However, because male and female other workers (part-time, self-employed or own account family workers) account for 20 per cent and 30 per cent respectively of the labour force population in the Canadian National Mobility Survey, the core-periphery distribution for full-time employees does not differ markedly from the total labour force core-periphery distributions (Table D, columns 1 and 2; 4 and 5).

Table D

CORE-PERIPHERY TYPOLOGIES FOR THE NATIVE BORN LABOUR FORCE, AGE 25-64 BY SEX AND TYPE OF WORKER, CANADA, 1973

	Males			Females			
Core-Periphery Typology	Total	Full Time Paid	Other Worker	Total	Full Time Paid	Other Worker	
Total	100.0	100.0	100.0	100.0	100.0	100.0	
Proxy Core ^(a) Proxy Periphery ^(a)	38. 0 62.0	43.6 56.4	15.2 84.8	22.1 77.9	26.3 73.7	13.0 87.0	
fotal ^(b) Reporting Occupation	100.0	100.0	100.0	100.0	100.0	100.0	
Proxy Core ^(a) Proxy Periphery ^(a)	38.8	44.1 55.9	15.4 84.6	25.0 75.0	27.8	15.8	
Total ^(b) Reporting Occupation	100.0	100.0	100.0	100.0	100.0	100.0	
Industry Core ^(C) Industry Periphery ^(C)	40.8 59.2	45.8	18.5 81.5	44.4	49.2 50.8	28.8 71.2	

(a) The proxy core sector consists of the following two digit SIC industrial categories: Public Administration; Durable Manufacturing; Transportation and Communication; Finance, Insurance and Real Estate. The proxy periphery sector is comprised of the following industries: Agriculture; Logging, Fishing, Mining; Non-durable Manufacturing; Construction; Wholesale Trades; Retail Trades; Community and Recreational Services; Personal Services; Other Services. Data include all persons reporting and not reporting occupation.

- (b) The proportions of the native born labour force population giving current occupational information were 74, 82, 57 per cent of women and 87, 88 and 80 per cent of the males in the total labour force, full-time wage, and other worker categories respectively.
- (c) The Core-Periphery industrial allocation outlined in footnote (a) is used with the following alterations: (1) Mining is placed in the core; (2) some manufacturing enterprises are reassigned from core to periphery and vice versa; (3) workers in the fields of education, social work and health are assigned to the public administration industry and hence to the core sector. This latter reallocation is responsible for most of the shifts between the two core-periphery typologies given in panels 1-2 and panel 3. Under this procedure, 62.3 per cent, 3.6 per cent and 4.5 per cent of the full-time paid native born women with occupations in the Community and Recreational, Personal and Other Service industries respectively were assigned to Public Administration, accounting for a reallocation of 21 per cent, and 12.3 of the full-time wage native born males in the Community and Recreational and Other Services were reassigned to Public Administration, accounting for a reallocation of 4.2 per cent of the male full-time wage labour force. See Appendix II text for a more detailed discussion.

APPENDIX III

Methods of Comparison and Interpretation

For those readers not familiar with regression analysis, a review of the interpretative terminology used in these analyses may be instructive. As noted earlier, metric coefficients indicate the magnitude of change produced in the dependent variable by an independent variable, controlling for the additional associations between variables in the regression model. Any given metric coefficient thus can be interpreted as indicating the magnitude of influence or the effect of one variable on another. When an additive linear relationship is depicted in the regression model between the independent and dependent variables, the metric coefficients are also correctly interpreted as the rate at which one variable is converted into another, or the rate of return to a given independent variable, expressed in units of the dependent variable. Thus a metric coefficient of \$500 for income (the dependent variable) regressed on education (the independent variable) indicates that the rate of return for each year of education is \$500. Alternatively, the \$500 also represents the magnitude of the effect which a one-year increment in education has on income. In this case, a one-year increment in education is associated with an increase of \$500 in income. In making comparisons across groups, sociologists frequently describe a larger metric coefficient of one group compared to another as indicating the greater ability of the first group to convert a given variable into another or as indicating a greater rate of return for a given independent variable.

Analyzing differences between two groups with respect to a dependent variable such as income is not limited to a comparison of metric coefficients or intercepts. One commonly used strategy of comparison is to substitute the mean characteristics for group A into the equation for group B and to calculate a hypothetical value for the dependent variable. This hypothetical mean can be interpreted in two alternative ways: (1) as the value group A would have if they had their own characteristics but the way of utilizing them according to the regression equation of group B; or (2) the value group B would have if they retained their own group specific way of converting their characteristics, but if they acquired the mean characteristics of group B. This procedure underlies what is termed the "decomposition of the differences in means" technique, discussed in Althauser and Wigler (1972), Kitagawa (1955), and Winsborough and Dickinson (1971). This technique depicts group differences in a dependent variable as resulting from: (1) group differences with respect to the composition of the independent variables; (2) group differences with respect to how these independent variables affect the dependent variable and (3) the interaction between composition and rates. As outlined by demographers this interaction term can be equally divided and assigned to the composition and rates components of the differences between two groups (Kitagawa, 1955).

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