AN INTER-OCCUPATIONAL AND INTER-INDUSTRY EMPIRICAL ANALYSIS OF LABOUR MARKET SEGMENTATION IN CANADA

by

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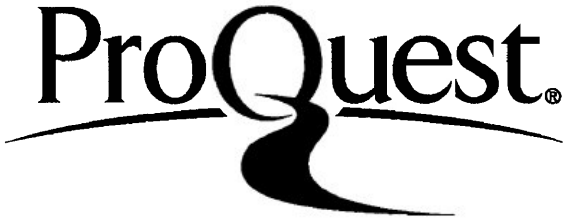

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ABSTRACT

The theory of labour market segmentation represents an assault on the conventional tenets held by the neoclassical school of labour economics. Essentially, the segmentation approach views the economic structure of the labour market as consisting of distinct sectors within which workers operate under fundamentally different rules and conditions, affecting both the distribution of employees among jobs, as well as the distribution of wages. These sectors act as barriers which prevent competitive forces from narrowing wage and earnings differentials. As a result, segmentation theory sees the poverty of the working poor as being mostly the fault of the economic system, as opposed to the individual workers themselves.

This study empirically examines the importance of non-competing labour markets for males in Canada, as hypothesized by a refined version of labour market segmentation theory. Using survey data from the Canadian National Mobility Study, semi-logarithmic earnings equations for each identified segment are specified and tested. The results produced demonstrate that statistically significant differences in labour force earnings are for the most part, present across both occupational and industrial labour market sectors. Specifically, differences in earnings were found across the primary upper tier and secondary segment within both the core and periphery sectors. In addition, substantial variation was also present across the core and periphery sector's primary upper and lower tiers. Overall, these

findings are interpreted as evidence which both support and extend the hypothesis that Canadian labour markets are segmented.

In consequence, past public policies which solely emphasized labour supply adjustments through human capital development have failed in improving the earnings and working conditions of disadvantaged workers because in themselves, they have not assisted those in the secondary and periphery segments to enter the primary and core sectors. Hence, a re-direction of policy which addresses the structural aspects of labour demand is required in order to remove the labour market barriers created by segmentation. Ultimately, a combination of both labour supply and demand policies are needed if we are to expect significant improvements in the earnings capacity of disadvantaged workers in Canada.

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CHAPTER I

INTRODUCTION

> Segmentation, taken literally, suggests a process - in particular, the compartmentalization and isolation of different groups of participants in the labour market - which is evoked, for example, by the concepts of non-competing groups and balkanization, or by the practice of apartheid. The aspect of segmentation that provides the economist with a particular interest in the concept is, however, the product, or outcome, of such a state of compartmentalization. Segmentation becomes interesting when it results in the failure of the labour market to treat its participants evenhandedly, in that it accords significantly different opportunities and rewards to otherwise comparable people. The functioning of such a labour market, then, diverges considerably from the competitive norm.
>
> (Ryan, 1981, pp. 3-4)

Although the theory of labour market segmentation is still relatively new in the economic literature, there has been a growing body of empirical evidence that supports its applicability in labour market analysis. Essentially, labour market segmentation theory emphasizes institutional, cultural and social relations in the determination of wages, incomes, upward mobility, economic success, and basic attitudes toward work. In addition, it questions the importance of neoclassical theory in describing the determination of earnings and places a greater emphasis on the demand side of the macro-economy than conventional neoclassical models.

The objective of this study is to determine if the labour market segmentation hypothesis has any relevancy in Canada. Utilizing male data from the 1973 Canadian National Mobility Study, this analysis will empirically test, through a semi-logarithmic regression model,

if worker location within occupational and industrial labour market segments, results in a distinctly different evaluation of human capital and earnings.

This study does not propose to explain the theoretical causes and reasons for segmentation itself. Rather, it endeavours to extend previous systematic empirical research by using a more comprehensive description of the various labour market segments. In this regard, it seeks to address a major criticism of segmentation theory which argues that the approach has been long on description and classification, but short on a testable framework capable of empirical scrutiny.

Briefly, this study proceeds in the following fashion. The first section of Chapter 2 highlights the historical development of labour market segmentation theory and compares it to the competing neoclassical paradigm. The second section reviews the major empirical research of economists reported in the literature, and summarizes their overall results. Chapter 3 identifies the criteria used in dividing the labour market segments and outlines the model to be estimated. Chapter 4 presents and analyzes the regression results while Chapter 5 reviews their implications on public policy. The final Chapter summarizes the study's major findings, proposes avenues for further research, and closes with a general conclusion.

CHAPTER II

THE SEGMENTATION OF LABOUR MARKETS

Theoretical Perspectives

A Partial Review of Previous Empirical Research

Theoretical Perspectives

The theory of labour market segmentation represents an assault on the conventional neoclassical school of labour economics.[1] Dissatisfaction with both the assumptions and conclusions of the orthodoxy have resulted in an on-going debate amongst economists (see Doeringer, 1967; Doeringer and Piore, 1971).

Briefly, the neoclassical model emphasizes market forces as the crucial factors in the determination of earnings and employment. The marginal productivity theory of demand based on the profit maximizing behaviour of employers, interacting with the theory of supply based on the utility maximization of workers, should ultimately result in a long-run Pareto-optimum allocation of labour resources within the economy. Hence, in this competitive homogeneous labour market paradigm, each unit of labour receives a real wage equal to its marginal product. To the degree that institutions such as unions or monopoly producers are recognized in this process, they are considered to be aberrations which distort, but do not displace the basic tenets of the theory. Beck, Horan and Tolbert (1978, p. 705) summarize the importance that the neoclassical model places on human capital investment and its consequent earnings implications in the following way:

> Like Adam Smith's "invisible hand" the competitive structure presumed by neoclassical theory guarantees that differential placement in the socioeconomic order is accomplished in a manner such that this placement is a reflection of a worker's basic value to the

> system. From this perspective, inequality of earnings must be a reflection of the dispersion of individual resources; low prestige and poverty wages must be the result of resource insufficiency; sporadic employment and job instability must be the products of inadequate commitment to work or a weak achievement motivation. In short, socio-economic success or failure is tied directly to the characteristics brought into the marketplace by the individual workers.

Segmentation theory on the other hand, views the economic structure of the labour market as consisting of distinct sectors within which workers operate under fundamentally different rules and conditions affecting both the distribution of employees among jobs, as well as the distribution of wages. Thus, these sectors act as barriers which prevent competitive forces from narrowing wage and earnings differentials. Labour market segmentation theory argues that labour markets are sharply separated because of factors affecting principally the demand for labour, and downgrades the importance of investment in human capital (see Clairmont, Apostle and Kreckel, 1983; Dickens and Lang, 1985; Harrison and Sum, 1979; Ryan, 1981).

The predecessor to the theory of labour market segmentation first appeared in Clark Kerr's classic article entitled "The Balkanization of Labor Markets" (1954). He described the trend towards the increased segmentation of labour markets into a variety of non-competing groups. Firms were observed as becoming increasingly divorced or insulated from the competitive forces of the external labour market with recruitment occurring only at the lower "ports of entry". Most jobs were filled by internal promotion from the firm's

"internal labour market". As such, administered rules and internal company policies governing the internal labour market became more important than the competitive economic forces that were only important for the seldom used external market.

Proponents of labour market segmentation theory grew out of studies developed in the late 1960s on urban poverty and unemployment in the United States. The perceived failure of the supply-side thrust of the "war on poverty" (ie. emphasis on training and investment in experience and other human capital) led economists to reject the neoclassical notion of a homogeneous labour market and argue that a gap existed which raised insuperable barriers to movements of workers between the high and low ranked jobs.[2] During this period, these social issues which had produced such a strong appeal in the United States, were not as relevant in Canada where regional employment concerns attracted more attention. However, with the passage of time, the importance of the segmentation perspective has markedly increased as a result of a greater interest in the special problems of low income and disadvantaged workers in all regions of the country.

Doeringer and Piore (1971) expanded upon and more precisely expressed the theoretical framework developed by Kerr. They assigned a crucial role to the internal labour market and argued that within each of these markets, well-developed hierarchies and stable employment relationships arise which become of mutual benefit to both management and employees.[3]

Doeringer and Piore (1971, p. 165) proceeded further by characterizing the labour market as being divided into primary and secondary segments:

> Jobs in the primary market possess several of the following characteristics: high wages, good working conditions, employment stability, chances of advancement, equity, and due process in the administration of work rules. Jobs in the secondary market, in contrast, tend to have low wages and fringe benefits, poor working conditions, high labour turnover, little chance of advancement, and often arbitrary and capricious supervision. There are distinctions between workers in the two sectors which parallel those between jobs: workers in the secondary sector, relative to those in the primary sector, exhibit greater turnover, higher rates of lateness and absenteeism, more insubordination, and engage more freely in petty theft and pilferage.

This description forms the basis of dual labour market theory which to recapitulate, proposes that the primary labour market consists of a series of internal labour markets with ports of entry, while the secondary sector is basically unstructured and open. The distinction between the two sectors is based upon mobility barriers and wage determination in favour of the primary market. That is, workers become trapped within the secondary sector while primary sector wages respond very little to the labour market forces of supply and demand. Furthermore, discrimination basically increases the labour force in the secondary sector, thus depressing the wage and giving employers an interest in perpetuating it.

Dichotomizing the labour market into two segments as suggested

by dual labour market theory is however, theoretically simplistic as well as impracticable for policy purposes. As Osterman (1975, p. 509) argues:

> Simply segmenting the labour force into two parts leaves a primary sector of enormous variety and poor definition.

Consequently, Piore (1975) has proposed that the primary segment may be divided into an upper and lower tier on the basis of worker autonomy and personal participation in the production of the final product or service. The upper tier exhibits higher pay and status along with better promotion opportunities than the lower tier. In addition, upper tier workers tend to have more job control, with individual economic situations more closely related to formal education, personal achievements, and personalities than in the lower tier, where tasks are likely to be more routinized.

The theory of labour market segmentation does not constitute a single, unified alternative to the neoclassical paradigm. Segmentation proponents differ with respect to the number and type of distinct segments they propose. Consequently, economists such as Aw (1981), Beck, Horan and Tolbert (1978), Boyd and Humphreys (1980), and others, have divided the labour market into industrial sectors. The most common distinction is between core and periphery industries which are generally defined according to such criteria as capital/labour ratios, productivity, unionization, scale of production, and scope of market product. Many other classification schemes have also been used (see Kaufman, Hodson and Fligstein, 1980; Tolbert, Horan and

Beck, 1980) and will be partially discussed in the next chapter.

Overall, the reasons for segmentation are difficult to isolate from the characteristics of the markets because cause and effect are interrelated. In essence, segmentation prevails because it produces characteristics in workers that sustain the segmentation. Workers are trapped in the secondary labour market in part because of their poor work habits which have in turn, resulted in part from their being employed in the secondary labour force. What becomes clear however, is the cumulative nature of the problem and the inherent difficulty of breaking out of the secondary labour market. As such, segmentation becomes self-perpetuating. Harrison and Sum (1979, p. 693) eloquently state this point as follows:

> The frequently heard argument that the major barrier excluding the poor from primary employment is their own lack of motivation to work ignores an important strand in labour market segmentation theory: Motivation, in particular, and worker behavior in general, are formed in response to confinement. In acclimatizing themselves to local work arrangements, some workers may find it psychologically as well as technically difficult to move from on stratum of the economy to another. Embedded in the dual labour market is the hypothesis that productivity and stability increase as wages increase. Thus, at the low wages prevalent in the secondary segment, poor productivity and lack of motivation are to be expected.

In conclusion, although strong criticisms of labour market segmentation theory have been advanced by many economists (see Cain, 1976; Mayhew and Rosewell, 1979; McNabb and Psacharopoulos, 1981; Smith, 1976; Wachter, 1974), the overall theoretical question no

longer concerns itself solely with the existence of segmentation. Rather, it more precisely asks along what lines and to what degree is the labour market actually segmented?

A Partial Review of Previous Empirical Research

For the most part, empirical research testing the validity of the segmentation hypothesis has compared wage equations for industrial or occupational sectors into which the labour market has been divided. The majority of studies have not only observed differential returns to human capital skills across the various labour market segments, but have also concluded that the mobility of workers between these segments is impeded.

The United States labour market has been extensively analyzed with respect to segmentation. Osterman (1975), in one of the more notable studies, has divided the labour force along occupational lines into three segments. The earnings equations he tested for each segment revealed that the wage-setting process differs substantially. Specifically, human capital variables tend to explain variations in earnings among jobs in the primary segment, but not among jobs in the secondary segment. He concluded that his findings strongly support the segmentation hypothesis for the United States labour market.

Rumberger and Carnoy (1980) examined the effects of segmentation on mobility and the determination of earnings for the United States. Their results indicated that there is little or no mobility in the

types of jobs and the types of industries people work in. They also found that there are large earnings differences between different occupational segments and between private competitive and non-competitive industries. They concluded that the major human capital variables are essentially unrewarded in the secondary segment of the labour market. Furthermore, as long as people work in the secondary market, increasing their education and training can only raise their incomes if the additional investment moves them out of secondary jobs and into higher-paying ones. As such, they also supported the segmentation perspective.

A whole series of similar conclusions for the United States were found by other studies which are too numerous to mention here in detail (see Beck, Horan and Tolbert, 1978; Dickens and Lang, 1985; Oster, 1979; Rosenberg, 1980; Wright, 1979).

On the other hand, there have been relatively few empirical studies examining labour market segmentation in Canada (see Robertson and Bertrand, 1975). Most of the research performed has been under the Marginal Work Project at Dalhousie University where the relationship between primary ("central work world") and secondary ("marginal work world") jobs was studied in the context of the economic dependency of the Atlantic provinces (Clairmont and Wein, 1975; Cornwall, 1977). It was discovered that the secondary market is essentially characterized by low wages, limited fringe benefits, little job security and restricted internal advancement opportunities. The primary market on the other hand, possesses high wages, extensive

fringe benefits and internal career ladders. Furthermore, researchers concluded that the location of the two worlds can be explained by factors that relate to technology, product market stability, unionization, ownership characteristics and geographic mobility.

Osberg, Mazany, Apostle and Clairmont (1986) have empirically tested the hypothesis for the Canadian Maritime economy that the determinants of job mobility and individual wages differ across occupational labour market segments and more specifically, that these differences were of the sort predicted by the segmentation perspective. Their findings revealed that mobility patterns and wage determination in fact do differ, and that the movement of workers between segments is minimal. Hence, they concluded that the labour market segments are not homogeneous, as proposed by the neoclassical model.

The Canadian labour market as a whole has also been studied by economists. Merrilees (1982) has empirically tested the notion that labour is segmented on the basis of age and sex. He evaluated various hypotheses using Allen elasticities of substitution between pairs of labour inputs obtained from jointly estimating labour demand functions. Overall, his results confirmed the segmentation hypothesis. Adult males, adult females, as well as young males and young females effectively work in different non-competing labour markets. In addition, he concluded that labour inputs based on age and sex appear to be complements rather than substitutes in production.

Further empirical studies of segmentation were carried out by Meng (1985) where substantial evidence was found to show that male

Canadian labour markets are segmented along occupational lines. Meng (1984) extended the analysis of segmentation beyond a static framework by examining the question of mobility between the various segments. Through the use of logit regression analysis, he demonstrated that there is considerable stability within the labour market segments over time. Specifically, he showed that secondary and lower tier primary jobs are not temporary staging positions for young people who will eventually move onto better paying positions. Meng (1984, p. 17) argued that the neoclassical model is inadequate and concluded that the segmentation hypothesis was more consistent with his empirical findings because:

> In almost all cases, the coefficients for the human capital variables were either insignificant for the secondary market or at least statistically different from the human capital coefficients in the other two markets. These results indicate that education, training, job market experience, or other human capital assets were not likely to lead to increases in incomes for members of the secondary labour market at a given point in time.

On an industrial basis, Boyd and Humphreys (1980) investigated through the use of an income attainment model, if Canadian sex differences in income are conditioned by location in the core or periphery labour market sectors. Using the Canadian National Mobility Study data-base, they discovered that location in the core sector has a more favourable impact on the income attainments of women than does location in the periphery. This difference however, was not found to exist for males.

Aw (1981) examined the characteristics of employers using a dual wage structure approach for primary and secondary workers in twenty-seven Canadian manufacturing industries. His main conclusion revealed that the characteristics of employers in the primary sector are significantly different from those in the secondary sector, indicating that the structure of the markets between the two sectors are not the same. Furthermore, his evidence suggested that labour in the primary and secondary wage sectors are in non-competing groups, leaving little room for inter-sector mobility.

Chapter II: Notes

Labour market segmentation can be traced to the theory of non-competing groups originated by Cairnes (1874). The concepts of labour market segmentation and dual labour market theory are used interchangeably by some authors. In this study however, dual labour market theory will be defined as a special case of the labour market segmentation approach, where the number of segments is two.

The North American literature in this area is surveyed in Harrison and Sum (1979) and Rumberger and Carnoy (1980). For a European review, consult Loveridge and Mok (1979).

For an in-depth theoretical discussion of internal labour market structures within firms, see Osterman (1982).

CHAPTER III

THE MODEL

Estimating Equations

Labour Market Division

Methodology

Data

Variables

Estimating Equations

It has become standard, particularly in human capital research, to take the natural logarithm of earnings and to express the relationship of income and the various human capital variables as a semi-logarithmic function (see Mincer, 1974). This transformation procedure is based on the theory of human capital and the resultant use of the Taylor series expansion. It has received empirical support against alternative functional forms in the works of Welland (1978) and Heckman and Polachek (1974). As a result, this study will also utilize a similar semi-logarithmic earnings function to test for the presence of inter-occupational and inter-industry segmentation in Canada's male labour market.

Labour Market Division

The criteria most often used to identify labour market segments in the past have included, characteristics of occupations (Doeringer and Piore, 1971), socio-economic status (Meng, 1984; Meng, 1985), industries or individual firms (Aw, 1981; Beck, Horan and Tolbert, 1978; Boyd and Humphreys, 1980; Oster, 1979), the distribution of wages and worker attributes (Dickens and Lang, 1985), the researcher's own value judgements (Osterman, 1975), job (Freedman, 1976; Rosenberg, 1980), and a mix of occupational characteristics and specific training requirements (Rumberger and Carnoy, 1980). The analysis in

this study segments the labour market both on industrial and socio-economic occupational criteria. A pooled model which isolates the socio-economic divisions located within, as well as across, each identified industrial sector is used as the delimiting characteristic.

The socio-economic occupational divisions are based on the Blishen-McRoberts (1976) socio-economic index, where approximately 480 occupational titles are ranked by education, income and perceived social class or occupational status.[1] The technique employed by Meng (1984; 1985) is also adopted in this analysis, whereby occupations are isolated within each market that roughly correspond to the conceptual framework developed by Piore (1975). The primary upper tier is composed of professional, managerial, and high status jobs while the primary lower tier consists of blue and white collar workers who have less status, are often more unionized, and who may or may not earn less income than primary upper tier workers. Secondary occupations possess a low social status, poorer incomes than primary lower tier workers, and have little opportunity for advancement (see Table A in the appendix for the principle occupations included in each segment).

On an industry level, this study closely although not identically follows the methodology employed by Beck, Horan and Tolbert (1978), and by Boyd and Humphreys (1980) which distinguishes between two sectors in the economy. 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, low profits, labour intensity and low levels of unionization. In addition, 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 wages, and a higher risk of work instability (see Table B in the appendix for the industries included in each sector).

In all the past empirical studies on labour market segmentation, the criteria used to determine the division of the various segments has been a constant source of controversy and criticism. Recognizing this analytical drawback however, Osterman (1975, p. 514) submits the following:

> Clearly, the ranking procedure is a major weakness....but it could be corrected only by someone with superior judgement or, even better, by the development of a generally agreed-upon set of criteria for each labour-force segment.

Since this universally accepted criteria as of yet does not exist, this analysis is also subject to the same shortcomings.

Methodology

Unlike previous more narrowly defined studies, the labour market segmentation model presented in this paper is broadened considerably by explicitly including both industrial and occupational dimensions. Multiple regression analysis is used within a human capital framework in order to observe the behaviour exhibited by

the standard earnings functions across the different labour markets.[2]

The first step in testing the validity of the segmentation hypothesis across occupational groupings requires dividing the labour market into core and periphery sectors. Semi-logarithmic earnings functions are then individually run on the primary upper tier, primary lower tier and secondary socio-economic divisions within each of the two separate core-periphery sectors. In the second step, a test for interaction is performed to determine if the coefficients in the earnings equations of the three socio-economic divisions, within each of the two sectors, are significantly different from each other.[3] If in fact, the results do indicate the presence of differences, then the theory of labour market segmentation across occupations will receive its required empirical support. On the other hand, if the produced coefficients are not significantly different, then the neoclassical view of labour will prevail.

The final step in this analysis invloves testing the segmentation hypothesis across industrial sectors. Three pooled regressions complemented by an interaction test are performed for each of the socio-economic divisions. As before, the same conditions for support of the appropriate theory apply, although this phase of the analysis isolates the inter-industry labour market divisions.

Data

The data employed in this analysis comes from the Canadian National Mobility Study, a detailed micro data file funded by a

Canada Council research grant and collected by Statistics Canada in conjunction with the July 1973 Canadian Labour Force Survey. The study, known as "CARMAC", was designed by a team of researchers including M. Boyd, H. McRoberts and J. Porter of Carleton University, F. Jones and P. Pineo of McMaster University, and J. Goyder from the University of Waterloo. Data is available for nearly 45,000 civilian non-institutionalized Canadian respondents aged 18 years and over for the year 1972.

In this paper however, the analysis in confined to a more restrictive population. Specifically, the sample consists of adult males (18 years of age and over) who were in the labour force (employed or unemployed) at the time of the survey. The decision to exclude females from this sample is based on the results of previous studies which have clearly shown serious theoretical and econometric problems created by the frequently intermittent nature of the life-cycle market work patterns of women. Only males with positive income from employment in 1972 were included in the sample, those who recorded net losses during the year were deleted. Furthermore, all records containing faulty or missing values on utilized variables were also dropped from the sample.

Variables

The cross-sectional regression model employed in this analysis adopts the standard human capital estimating equation with the

natural log of annual earnings (LNEARN) as the dependent variable, and a series of key explanatory variables as defined in Table 1. Midpoint values are assigned to the earnings variable since the survey reported this data in a grouped format.

Education (EDUC) is measured in years, based on the respondent's report of the number of completed years of schooling attained. Labour market experience (EXP) is based on the actual number of years worked for pay or profit. This measure is substantially superior to the commonly used proxy variable potential experience, developed by Mincer (1974). Potential experience or T (which is equal to Age minus Education minus 5) represents the maximum possible experience obtainable by an individual, thus implying the total absence of voluntary or involuntary unemployment. Consequently, the T identity tends to over-estimate actual experience for both older and less well-educated workers. This is clearly evident in Table C (see Appendix) which reports the difference between actual and potential mean experience for the various labour market segments. In both the core and periphery sectors, the break between the two measures increases as we move from the primary upper tier to the secondary segment in the sample. This confirms that potential experience increasingly over-estimates actual experience by just over 5 years in the core sector and just under 5 years in the periphery sector. As such, the use of T is avoided in this analysis due to the systematic differences that it creates between the various labour market segments.

The rate of monetary returns to experience is known to diminish

TABLE 1

Definitions of Variables

LNEARN	Natural log of annual earnings (income from wages and salaries plus net income from self-employment) 1972, (coded from income class data)
EDUC	Years of schooling
EXP	Labour market experience (number of years worked for pay or profit)
EXP2	Experience squared
HR*	Work less than 35 hours per week in 1972
LNWKS	Natural log of weeks worked in 1972, (coded from class data)
SELF*	Self-employed in incorporated or unincorporated business
NOTMAR*	Not married (ie. single, separated, divorced or widowed)
PROVINCE/REGION OF LOCATION*	Place of residence in 1972
ATL	Atlantic provinces (Newfoundland, Prince Edward Island, Nova Scotia and New Brunswick)
PQ	Quebec
ONT	Ontario (reference group)
PRA	Prairie provinces (Manitoba, Saskatchewan and Alberta)
BC	British Columbia
APPR*	Completed an apprenticeship or training program
UNEMP	Unemployed periods of three months or more since first job
MOVCTY	Number of moves between cities since age 16
MOVPRV	Number of moves between provinces since age 16

TABLE 1 (concluded)

URBAN/RURAL LOCATION*	Place of residence in 1972
METRO	Urban area population greater than or equal to 100,000 (reference group)
MEDCITY	Urban area population less than 100,000 and greater than or equal to 5,000
TOWN	Urban area population less than 5,000 and greater than or equal to 1,000
RURAL	Rural area, farm and non-farm
LANGUAGE*	Ability to converse in English, French or other languages
ENG	Unilingual English (reference group)
FROT	Unilingual French or other language with the exception of English
BIL	Bilingual English and French

* = Dummy variable: 1 if criterion satisfied, 0 otherwise

after a certain number of years in the labour force (Mincer, 1974). This nonlinear life-cycle effect is captured by the decay term, experience squared (EXP2). Following Mincer (1974), Meng (1985), and others, this model controls for weeks worked. When the log of weeks worked (LNWKS) is held constant, variations in the dependent variable reflect differences in weekly earnings. Similarly to the previously discussed earnings variable, discrete values are assigned for weeks worked. A dummy variable for marital status (NOTMAR) is also included since it is often observed that married males earn more than other males (likely the result of their greater commitment to the labour market).

A series of dummy variables are introduced to control for province/region (ATL, PQ, ONT, PRA, BC) and urban/rural (METRO, MEDCITY, TOWN, RURAL) location since the cost of living is known to vary across provinces and between urban and rural areas. The model is also augmented with measures of fluency in the official languages (ENG, FROT, BIL). Carliner (1981) has demonstrated that language skills are an important human capital variable that are likely to have differential pay-offs in Quebec and the rest of Canada (excluding Quebec), and for this reason, they are included in the model.

Other variables which appear in the estimating equation include a control for self-employment status (SELF), hours worked per week (HR), and the completion of an apprenticeship or training program (APPR). Reported annual earnings may differ as a result of the presence or absence of these variables. Measures of job stability (UNEMP) and

mobility (MOVCTY, MOVPRV) are also included as explanatory variables due to their causal impacts on earnings.

Chapter III: Notes

As Meng (1985) points out, it would have been especially useful for evaluating segmentation theory if occupations are also distinguished by a fourth factor; job stability. Unfortunately, stability is difficult to empirically estimate since its major components would include: authority-autonomy on the job, skill level, skill utilization on the job, unionization and the existence of job ladders.

The results of the multiple regression analysis reported in this study were performed using SPSS (Statistical Package for the Social Sciences) programs on the Lakehead University VAX 11/780 main-frame computer.

For an in-depth explanation of the interaction test procedure, consult Johnston (1972, pp. 204-06).

CHAPTER IV

EMPIRICAL RESULTS AND ANALYSIS

Inter-Occupational

(a) Core Sector

(b) Periphery Sector

Inter-Industry

Inter-Occupational

(a) Core Sector

Table 2 reports the sample means for the various socio-economic occupational divisions in the core sector of the labour market. As expected, the figures indicate a sizable earnings advantage in the primary upper tier of almost 50 per cent ($10,941 versus $7,324 for the whole sample). In addition, primary upper tier workers hold on average, 3.6 extra years of schooling, the most stable employment record (having worked approximately 90 per cent of the year), the largest fraction of bilingual Canadians, and the highest degree of mobility between cities as well as between provinces. They are also more likely to have completed an apprenticeship or training program, be married, and live in metropolitan cities primarily located in Ontario. On the other hand, primary upper tier employees are less likely to be self-employed.

Interestingly enough, primary upper tier workers possess on average, 1 year less experience than that recorded for the whole sample. Furthermore, they also have less experience than secondary workers. This result, can be partly attributed to the exclusion of women from the sample in this analysis, thereby undoubtably reducing the size of the secondary labour market far greater than it actually would be.

Comparing the other occupational divisions, primary lower tier workers have characteristics that are quite similar to the means

TABLE 2

Core Sector Sample Means for the Labour Market Segments in Canada

VARIABLE	PRIMARY UPPER TIER	PRIMARY LOWER TIER	SECONDARY	TOTAL
Annual Earnings ($)	10,941	7,336	4,262	7,324
Education (years)	14.69	10.79	8.88	11.05
Experience (years)	17.43	18.63	17.77	18.43
Age (years)	37.80	37.20	36.80	37.30
Percent Working Less Than 35 Hours/Week	4.11	3.91	5.97	4.10
Weeks Worked	46.54	45.28	35.31	44.50
Percent Self-Employed	1.60	4.68	16.72	5.33
Percent Not Married	12.56	18.10	30.15	18.49
Percent in Atlantic Provinces	15.07	17.33	40.30	18.94
Percent in Quebec	21.46	21.24	22.69	21.38
Percent in Ontario	35.62	30.41	10.15	29.34
Percent in Prairie Provinces	18.95	17.36	11.34	17.04
Percent in British Columbia	8.90	13.66	15.52	13.30
Percent Who Completed Apprenticeship	26.26	25.56	10.15	24.39
Number of Unemployed Periods of 3 Months or More	0.43	1.28	3.08	1.33
Number of Moves Between Cities	3.14	2.09	1.15	2.13

TABLE 2 (concluded)

VARIABLE	PRIMARY UPPER TIER	PRIMARY LOWER TIER	SECONDARY	TOTAL
Number of Moves Between Provinces	1.10	0.79	0.49	0.80
Percent Living in Metropolitan City	63.47	40.25	18.21	40.93
Percent Living in Medium Size City	10.73	8.98	1.79	8.58
Percent Living in Smaller Town	15.07	23.40	21.19	22.34
Percent Living in Rural Area	10.73	27.37	58.81	28.15
Percent Unilingual English	68.04	72.36	65.67	71.37
Percent Not Speaking English	0.91	8.80	20.30	8.89
Percent Bilingual	31.05	18.84	14.03	19.74
Percent in Sample	10.56	81.37	8.07	100.00
N	438	3376	335	4149

reported for the whole core sector. This is not a surprising result, given that the primary lower tier constitutes over 81 per cent of the total sample.

Secondary workers earn on average, 42 per cent less than the sample mean - the lowest in the core sector. This differential may reflect the fact that secondary workers have little stability in employment (working only about 68 per cent of the year), 2.2 years less schooling and 1 year less experience than the sample mean. Furthermore, they are more likely to speak French or another language (except English), be single, self-employed and living in rural areas primarily located in the Atlantic provinces. Moreover, secondary workers are less likely to have completed an apprenticeship or training program, and to consider job mobility between both cities and provinces. In order to analyze the sources of these core sector earnings differentials, this study will now turn to an econometric analysis.

The earnings regressions for the various core sector labour market segments are reported in Table 3. The major human capital variables are all important determinants of earnings, although some surprising findings have resulted with respect to their expected order of magnitude and significance. With regards to education for example, core secondary workers receive higher returns to schooling (5.34 per cent) than primary employees. Judged in relative terms, the secondary segment alone produces returns which exceed the total core sector schooling returns (4.98 per cent), while both primary tiers receive returns that are less.

TABLE 3

Core Sector Earnings Functions for the Labour Market Segments in Canada

	PRIMARY UPPER TIER	PRIMARY LOWER TIER	SECONDARY	TOTAL
EDUC	0.047703	0.038568	0.053456	0.049868
	(7.897)*	(14.076)*	(4.812)*	(21.403)*
EXP	0.055159	0.031406	0.035389	0.035890
	(11.234)*	(15.099)*	(4.854)*	(18.889)*
EXP2	-0.000931	-0.000547	-0.000563	-0.000614
	(9.310)*	(13.675)*	(3.753)*	(15.350)*
HR	-0.064900	-0.226424	-0.401700	-0.223072
	(0.783)	(6.328)*	(3.531)*	(6.904)*
LNWKS	0.797169	0.723170	0.526144	0.705670
	(15.342)*	(31.608)*	(9.533)*	(35.949)*
SELF	0.282349	-0.079330	-0.229990	-0.113733
	(2.195)**	(2.416)**	(2.893)*	(3.942)*
NOTMAR	-0.143512	-0.224380	-0.182922	-0.222528
	(2.717)*	(11.141)*	(2.763)*	(12.094)*
ATL	-0.065516	-0.218199	-0.314566	-0.223560
	(1.247)	(10.037)*	(2.841)*	(11.139)*
PQ	-0.033487	-0.047783	-0.203309	-0.055289
	(0.615)	(1.652)***	(1.545)	(2.129)**
PRA	-0.042581	-0.086686	-0.072412	-0.085399
	(0.904)	(4.079)*	(0.579)	(4.287)*
BC	0.000106	0.019341	0.296493	0.027919
	(0.002)	(0.847)	(2.534)**	(1.302)
APPR	-0.040072	0.093115	-0.030609	0.069404
	(1.067)	(5.709)*	(0.332)	(4.554)*
UNEMP	-0.025297	-0.009546	0.008246	-0.007291
	(2.166)**	(4.503)*	(1.649)***	(3.837)*
MOVCTY	-0.004529	0.006330	-0.026895	0.004827
	(0.974)	(2.649)*	(1.998)**	(2.214)**

TABLE 3 (concluded)

	PRIMARY UPPER TIER	PRIMARY LOWER TIER	SECONDARY	TOTAL
MOVPRV	0.018781 (2.420)**	0.002805 (0.874)	0.035565 (2.382)**	0.006611 (2.196)**
MEDCITY	-0.090462 (1.649)***	-0.039034 (1.499)	-0.069399 (0.324)	-0.046516 (1.898)***
TOWN	-0.116081 (2.347)**	-0.029456 (1.600)	-0.037984 (0.410)	-0.047959 (2.759)*
RURAL	-0.146588 (2.633)*	-0.081056 (4.417)*	-0.076466 (0.889)	-0.100185 (5.798)*
FROT	-0.029000 (0.165)	-0.130254 (3.538)*	0.125412 (1.132)	-0.101794 (3.083)*
BIL	0.026446 (0.578)	0.003671 (0.151)	-0.046646 (0.529)	0.011718 (0.543)
CONSTANT	5.089508	5.546656	5.941980	5.461342
$\overline{R}^2$	0.636	0.497	0.496	0.544
	39.167	167.947	17.423	248.868
	438	3376	335	4149

Notes: a) The dependent variable is the natural log of earnings LNEARN.
b) The absolute value of t-statistics are reported in parentheses beneath each coefficient where:
* = statistically significant at the 1% level
** = statistically significant at the 5% level
*** = statistically significant at the 10% level.

The returns to experience for the primary upper tier show a strikingly significant advantage over the other segments in the core sector, although the returns to the secondary workers again exceed those to the primary lower tier. The results for language skills are also somewhat unexpected as most variables are rarely significant. Specifically, it seems puzzling that there is no advantage in being bilingual or that primary workers are not significantly penalized for being unable to speak English.

The parameter estimates produced for the job stability variable UNEMP are rather revealing. While both the primary tier coefficients indicate an inverse relationship with the earnings variable, the secondary segment estimate demonstrates a positive causal relationship. A possible explanation for these results is based on the concepts of job-specific human capital and search theory (see Stigler, 1961). Long-term unemployment in the primary tiers of the core sector results in a loss of job-specific skills as rapid technological change and a lack of day-to-day job attachment make it increasingly more difficult for an individual to re-enter the highly skilled labour market. This results in reduced earnings.

In the case of the secondary worker however, long periods of unemployment provide the individual with more time for job search and consequently, the likelihood of obtaining better employment is increased. Since job specific skills in this labour market segment are not a relevant factor, earnings tend to rise with the amount of time available to seek employment.

Other important results emerging from Table 3 include the parameter estimates for the log of weeks worked. For all segments, the elasticity of earnings with respect to weeks worked is less than one, being highest for the primary upper tier and lowest for the secondary. This difference in coefficients may in part reflect variations in the seaonality of employment. The urban/rural and provincial/regional dummy variables are frequently significant, presumably reflecting, among other things, cost of living differentials in favour of metropolitan cities within Ontario. Moreover, within all core sector labour market segments, individuals who are not currently married earn substantially less than similar married males.

Further points of contrast between the core sector labour market segments deserve note. Among the primary upper tier, the self-employed earn a premium compared to the employed, whereas for the other segments, the converse is true. Finally, secondary employees working part-time (as compared to full-time) are penalized more than those working in the other segments.

Table 4 presents the results of the differences across the core sector market segments. It is quite apparent, that only the earnings function of the primary upper tier differs substantially from that of the secondary segment. Out of the five human capital variables tested, four of the differences are statistically significant. Education alone shows a similar pattern across the two market segments.

Statistically significant differences amongst the remaining

TABLE 4

Significance of Differences in Coefficients

Core Sector Selected Variables

	DEVIATIONS FROM SECONDARY		DEVIATIONS FROM PRIMARY LOWER TIER
	PRIMARY UPPER TIER	PRIMARY LOWER TIER	PRIMARY UPPER TIER
EDUC	-0.006822 (0.611)	-0.015957 (1.771)***	0.009134 (1.213)
EXP	0.018173 (2.200)**	-0.004835 (0.775)	0.023009 (3.747)*
EXP2	-0.000347 (2.041)**	0.000029 (0.223)	-0.000376 (2.892)*
HR	0.323906 (2.402)**	0.142297 (1.426)	0.181608 (1.751)***
LNWKS	0.285400 (3.698)*	0.210978 (4.193)*	0.074422 (1.112)
CONSTANT	-0.875596 (2.681)*	-0.422452 (1.995)**	-0.453144 (1.614)

Notes: a) The absolute value of t-statistics are reported in parentheses beneath each coefficient where:
* = statistically significant at the 1% level
** = statistically significant at the 5% level
*** = statistically significant at the 10% level.

b) These differences are estimated by pooling the three samples in one regression and introducing interaction terms to allow the above key variables to vary from the specified reference group. Consequently, the estimated coefficients represent the difference between the coefficients for the labour market segment versus those for the selected reference group. The usual t-tests apply (Johnston, 1972, pp. 204-06).

labour market segments also exist, although to a somewhat lesser degree. Of particular interest, is the significant finding (at the 10 per cent level) that primary lower tier workers as a group earn a lower rate of return to education as compared to the secondary workers.

Other differences also emerge from Table 4. The coefficients for experience, experience squared and hours worked differ significantly between the primary upper and lower tiers. In contrast, education and weeks worked show no divergence across the two respective segments.

In summary, statistically significant differences in earnings are distinctively present across the primary upper tier and secondary segment of the core sector. On the other hand, while some significant differences between the other market segments are also present, they do not prove to be as overwhelmingly conclusive. Nevertheless, the empirical results produced by these regressions tend to more closely support the segmentation hypothesis vis-a-vis the labour market framework proposed by neoclassical theory.

(b) Periphery Sector

The sample means for each of the socio-economic occupational divisions in the periphery sector are reported in Table 5. The characteristics that determine earnings follow a similar pattern to those previously presented in the core sector and consequently, only

TABLE 5

Periphery Sector Sample Means for the Labour Market Segments in Canada

VARIABLE	PRIMARY UPPER TIER	PRIMARY LOWER TIER	SECONDARY	TOTAL
Annual Earnings ($)	11,795	6,493	3,663	6,242
Education (years)	16.18	10.84	9.06	11.08
Experience (years)	14.89	17.99	23.85	18.72
Age (years)	36.60	36.90	42.70	37.90
Percent Working Less Than 35 Hours/Week	6.89	5.41	7.05	5.86
Weeks Worked	47.24	43.87	43.88	44.21
Percent Self-Employed	14.75	12.29	57.82	20.68
Percent Not Married	12.62	20.35	26.54	20.64
Percent in Atlantic Provinces	14.43	20.71	13.51	18.77
Percent in Quebec	20.98	22.47	20.56	21.97
Percent in Ontario	32.46	27.48	19.60	26.59
Percent in Prairie Provinces	20.33	19.12	41.99	23.33
Percent in British Columbia	11.80	10.22	4.34	9.34
Percent Who Completed Apprenticeship	17.87	25.52	11.10	22.14
Number of Unemployed Periods of 3 Months or More	0.56	1.31	1.17	1.20
Number of Moves Between Cities	2.83	2.04	1.36	2.00

TABLE 5 (concluded)

VARIABLE	PRIMARY UPPER TIER	PRIMARY LOWER TIER	SECONDARY	TOTAL
Number of Moves Between Provinces	0.92	0.71	0.47	0.69
Percent Living in Metropolitan City	57.06	38.96	12.45	36.14
Percent Living in Medium Size City	11.80	8.83	4.73	8.41
Percent Living in Smaller Town	20.16	24.06	11.58	21.42
Percent Living in Rural Area	10.98	28.15	71.24	34.03
Percent Unilingual English	65.74	68.95	73.26	69.38
Percent Not Speaking English	3.11	10.70	17.57	11.13
Percent Bilingual	31.15	20.35	9.17	19.49
Percent in Sample	10.51	71.64	17.85	100.00
N	610	4157	1036	5803

notable deviations will be discussed.

As a group, primary upper tier workers earn on average, 89 per cent more than the whole sample and a dramatic 222 per cent more than the secondary segment. Surprisingly however, the primary upper tier has the least experience in the periphery sector. Secondary workers, on the other hand, receive the lowest earnings in the sector ($3,663 versus $6,242 for the whole sample) while possessing the most work experience. This result corresponds to the finding reached by Meng (1984, p. 6) where he concludes:

> There seems little doubt that once an individual becomes attached to one of the three markets, the tendency is to remain there. Although consistent with the segmentation hypothesis, this result contrasts sharply with neo-classical predictions.

The empirical results of the periphery sector labour market earnings functions are presented in Table 6. As expected, the experience-schooling profile of the primary upper tier is significantly steeper than for the other segments. Moreover, in contrast to the core sector, periphery secondary employees working part-time are penalized significantly less than other workers.

While all individuals in the periphery sector labour market who are not currently married earn less than their married counterparts, those in the secondary segment are penalized the most. The remaining results require little discussion as the other human capital variables performed more or less like those in the core sector. However, it should be noted that the regression results indicate

TABLE 6

Periphery Sector Earnings Functions for the Labour Market Segments in Canada

	PRIMARY UPPER TIER	PRIMARY LOWER TIER	SECONDARY	TOTAL
EDUC	0.046421	0.029084	0.023894	0.048620
	(9.120)*	(10.975)*	(2.634)*	(21.419)*
EXP	0.044299	0.037987	0.028716	0.038481
	(8.755)*	(18.263)*	(5.512)*	(20.689)*
EXP2	-0.000715	-0.000719	-0.000543	-0.000721
	(5.958)*	(17.975)*	(6.033)*	(18.025)*
HR	-0.293108	-0.300399	-0.101995	-0.255059
	(4.511)*	(9.187)*	(1.182)***	(8.426)*
LNWKS	0.643323	0.612065	0.393889	0.574036
	(9.210)*	(29.174)*	(6.435)*	(27.812)*
SELF	0.112514	-0.073055	-0.206430	-0.191341
	(2.441)**	(3.206)*	(3.543)*	(9.873)*
NOTMAR	-0.130746	-0.302365	-0.435204	-0.359506
	(2.541)**	(14.939)*	(7.769)*	(18.744)*
ATL	-0.071762	-0.182922	-0.179971	-0.141184
	(1.329)	(7.953)*	(2.183)**	(6.209)*
PQ	-0.094487	-0.098257	-0.106387	-0.103403
	(1.710)***	(3.328)*	(0.943)	(3.605)*
PRA	-0.110893	-0.161533	-0.023441	-0.176443
	(2.340)**	(7.289)*	(0.375)	(8.536)*
BC	0.015568	0.036972	0.202343	0.056260
	(0.284)	(1.369)	(1.713)***	(2.083)**
APPR	0.000165	0.097799	-0.113484	0.069536
	(0.004)	(5.719)*	(1.589)	(4.026)*
UNEMP	-0.004603	-0.007178	-0.001045	-0.003459
	(0.509)	(3.176)*	(0.167)	(1.565)
MOVCTY	0.000950	0.005466	-0.000435	0.007572
	(0.192)	(2.135)**	(0.043)	(3.029)*

TABLE 6 (concluded)

	PRIMARY UPPER TIER	PRIMARY LOWER TIER	SECONDARY	TOTAL
MOVPRV	-0.007054	0.000958	-0.007440	-0.001168
	(0.922)	(0.261)	(0.503)	(0.320)
MEDCITY	0.009967	-0.026002	-0.009101	-0.013422
	(0.187)	(0.942)	(0.077)	(0.492)
TOWN	-0.029092	-0.106241	-0.123647	-0.112666
	(0.651)	(5.352)*	(1.359)	(5.614)*
RURAL	-0.111205	-0.163057	-0.253764	-0.266008
	(2.036)**	(8.269)*	(3.327)*	(13.876)*
FROT	-0.106979	-0.033256	-0.079213	-0.046210
	(1.002)	(0.939)	(0.688)	(1.359)
BIL	0.044614	0.009631	0.099927	0.051182
	(1.038)	(0.404)	(1.154)	(2.235)**
CONSTANT	5.813982	6.040661	6.762980	5.989126
$\overline{R}^2$	0.429	0.456	0.197	0.453
-	23.849	175.251	13.733	240.821
	610	4157	1036	5803

Notes: a) The dependent variable is the natural log of earnings LNEARN.
b) The absolute value of t-statistics are reported in parentheses beneath each coefficient where:
* = statistically significant at the 1% level
** = statistically significant at the 5% level
*** = statistically significant at the 10% level.

that the financial rewards to the major human capital variables are significantly greater for all segments in the core sector vis-a-vis those in the periphery.[1] Therefore, it can clearly be concluded that the sector of worker location plays a significant and lasting role in the determination of employee earnings.

Table 7 reports the differences across the periphery sector labour market segments. The results produced clearly indicate that statistically significant deviations exist between the primary lower tier and the secondary segment, with the sole exception of education. In addition, significant differences are also present between the tested variables of the primary upper tier vis-a-vis those of the secondary socio-economic occupational division. Only experience and experience squared show no divergence across the two respective segments.

The differences between the coefficients of the primary upper and lower tier however, are not as pronounced. Education alone shows a statistically significant difference, while the remaining human capital variables tested demonstrate a similar pattern across the two market segments.

In summary, statistically significant differences in earnings exist pari passu between the secondary versus the primary upper and lower tiers of the periphery sector. Meanwhile, the differences amongst the two primary tiers are for the most part insignificant. Nevertheless, as was the case in the core sector, the econometric results reported in the periphery sector also tend to display systematic

TABLE 7

Significance of Differences in Coefficients

Periphery Sector Selected Variables

	DEVIATIONS FROM SECONDARY		DEVIATIONS FROM PRIMARY LOWER TIER
	PRIMARY UPPER TIER	PRIMARY LOWER TIER	PRIMARY UPPER TIER
EDUC	0.015854 (1.752)***	-0.001029 (0.150)	0.016883 (2.402)**
EXP	0.012175 (1.626)	0.008593 (1.953)***	0.003582 (0.524)
EXP2	-0.000123 (0.724)	-0.000172 (2.150)**	0.000049 (0.306)
HR	-0.188851 (1.827)***	-0.201281 (2.786)*	0.012430 (0.139)
LNWKS	0.239038 (2.377)**	0.211413 (4.217)*	0.027624 (0.297)
CONSTANT	-0.744014 (1.869)***	-0.608101 (3.056)*	-0.135913 (0.369)

Notes: a) The absolute value of t-statistics are reported in parentheses beneath each coefficient where:
* = statistically significant at the 1% level
** = statistically significant at the 5% level
*** = statistically significant at the 10% level.

b) These differences are estimated by pooling the three samples in one regression and introducing interaction terms to allow the above key variables to vary from the specified reference group. Consequently, the estimated coefficients represent the difference between the coefficients for the labour market segment versus those for the selected reference group. The usual t-tests apply (Johnston, 1972, pp. 204-06).

differences amongst the occupational segments lending additional empirical credence to the segmentation hypothesis. Overall, these results are consistent with the inter-occupational findings reported by Osterman (1975) and Meng (1985), although they are not as strikingly significant. In particular, the alleged inadequacy of human capital investment in the secondary segment as proposed by the theory of labour market segmentation is not supported in either the core or periphery sectors of this analysis, and to this extent, the results in this study are somewhat mixed.

Inter-Industry

At this point in the analysis, the socio-economic division sample means across industry sectors are compared in order to isolate the differences between industries (Tables 2 and 5). On a segment by segment basis, core sector earnings, as expected, are greater than periphery sector earnings on average. The sole exception lies with the primary upper tier, where the periphery earnings exceed those of the core by almost 8 per cent. This unexpected finding, can in part be explained however, by the model's reliance on grouped income data which reduces the income variability of the traditionally higher paid upper tier core employees.

Other surprising results include: greater years of schooling for all segments in the periphery sector vis-a-vis the corresponding core sector segments; almost 3 times the amount of unemployed periods

for the core sector secondary workers versus their periphery sector counterparts; and over 6 years more experience for secondary workers in the periphery sector as compared to the core.

Two other salient observations emerge from comparing the sample means in Tables 2 and 5. Firstly, there is significantly more self-employment across all segments of the periphery sector. Secondly, although a regional dimension to segmentation is clearly present in both industrial sectors, secondary workers in the core are primarily located in the Atlantic provinces while the corresponding workers in periphery sector are concentrated in the Prairies.

Table 8 reports the test for differences across the core-periphery industrial sectors. The empirical results produced show a substantial difference between the primary upper tier of the core versus the corresponding segment in the periphery. Only education and experience squared demonstrate a similar pattern across industries. In addition, the core sector primary lower tier results display an even stronger divergence against the equivalent periphery sector market segment. All of the tested human capital variables with the exception of hours worked, have produced statistically significant differences across the two industries. Of particular interest, is the finding (at the 1 per cent level of statistical significance) that core sector primary lower tier workers receive a lower return to experience than their counterparts in the periphery sector. A possible explanation for this anomaly is offered by Boyd and Humphreys (1980, p. 407) where they warn that:

TABLE 8

Significance of Differences in Coefficients

Inter-Sector Selected Variables

	DEVIATIONS FROM PERIPHERY SECTOR			
	CORE SECTOR PRIMARY UPPER TIER	CORE SECTOR PRIMARY LOWER TIER	CORE SECTOR SECONDARY	CORE SECTOR TOTAL
EDUC	0.003327 (0.419)	0.009335 (2.544)**	0.026035 (1.618)	-0.004169 (1.303)
EXP	0.013014 (1.911)***	-0.009283 (3.351)*	-0.003537 (0.352)	-0.007867 (3.014)*
EXP2	-0.000253 (1.581)	0.000214 (3.567)*	0.000130 (0.650)	0.000190 (3.800)*
HR	0.234058 (2.171)**	0.075843 (1.527)	-0.300505 (1.748)***	0.038823 (0.823)
LNWKS	0.147689 (1.711)***	0.101698 (3.217)*	0.098032 (1.059)	0.107446 (3.614)*
CONSTANT	-0.757284 (2.179)**	-0.367352 (2.966)*	-0.409737 (1.096)	-0.234576 (2.043)**

Notes: a) The absolute value of t-statistics are reported in parentheses beneath each coefficient where:
* = statistically significant at the 1% level
** = statistically significant at the 5% level
*** = statistically significant at the 10% level.

b) These differences are estimated by pooling the two samples in one regression and introducing interaction terms to allow the above key variables to vary from the periphery sector. Consequently, the estimated coefficients represent the difference between the coefficients for the core sector labour market segments versus the corresponding segments in the periphery sector. (Johnston, 1972, pp. 204-06) The usual t-tests apply.

> Caution must be used against the use of cross-sectional data to infer the effect of a variable such as labour force experience, which changes over time.

In contrast, no statistically significant differences were found between the core and periphery sector secondary markets. The only exception is the hours worked variable, which differs significantly across industries at the 10 per cent level. Furthermore, the produced coefficient indicates that core sector secondary employees are penalized more by working part-time than their periphery sector counterparts. The test for differences in intercepts indicates that there is a significant effect of being in the periphery (for all segments with the exception of the secondary) as compared to location in the core net of the differential returns to the other selected human capital variables.

Dividing the labour market and estimating separate earnings equations for the resulting segments has been criticized by several economists, including Cain (1976), Smith (1976) and Krause (1977). They argue that this procedure leads to misleading empirical results as the criteria used to demarcate the various segments is based on endogenous characteristics which will inevitably lessen the impact of human capital endowments in both the secondary as well as the periphery strata.

However, the results produced in this analysis clearly demonstrate that this "truncation bias" argument has no empirical support. On an industry level for example, mean earnings in the primary upper tier of the periphery sector are greater than those of the core. The

same is also true of education across all segments. With respect to occupations, returns to education for secondary core workers sharply exceed those from the primary tiers. Furthermore, secondary workers in the periphery sector possess the highest average experience while primary upper tier employees hold the least. Similar although not identical results were also found by Meng (1985) and Boyd and Humphreys (1980).

In summary, while substantial significant differences exist across the core and periphery sector primary upper and lower tiers, there is virtually no difference between the secondary segment of the two industrial sectors. In fact, the secondary market produces some rather disturbing and inexplicable results. For example, the secondary sample means indicate the presence of less employment stability for the core workers as compared to their periphery counterparts. Nevertheless, the tests for interaction as reported in Table 8 tend to refute the neoclassical viewpoint and support the argument that the labour market is segmented across the core and periphery industrial sectors.

Chapter IV: Notes

The overall regressions are all statistically significant as witnessed by the fact that the reported F statistic is greater than the critical value of F in all cases at the 1 per cent level of significance (for both Tables 3 and 6). In addition, the amount of variance explained by the regressions is well within the normal range for studies of this type. Since the data used describes individuals and not aggregate economic quantities, a great deal of random "noise" must be expected, and consequently, most earnings functions produce an $\bar{R}^2$ in the range of 20 to 40 per cent.

CHAPTER V

POLICY IMPLICATIONS

The segmentation model presented in this study essentially confirms that the Canadian labour market is divided into various non-competing distinct sectors which impede the free mobility of workers. Consequently, past as well as current labour market policies directed solely at improving labour supply adjustments through formal education, training, and job market information have neglected to deal with the real problems of the market. Specifically, these policies have not been successful in eliminating shortages of specific skills, low income and disadvantaged workers in Canada. As a result, Canadian public policy has excessively emphasized the quality of workers at the cost of overlooking the quality of jobs available to these workers.

Segmented labour market analysis suggests a re-emphasis towards the structural aspects of labour demand, and a de-emphasis of the traditional human capital labour supply structures. More precisely, the structure of labour demand is seen as being the most important determinant of the wages and working conditions of workers. Thus, market characteristics as reflected by the industry, occupation, region and firm in which workers are located, are more important than the characteristics of the actual workers themselves. As such, these market characteristics are primarily responsible for creating the low wages of the working poor in the secondary and periphery labour market sectors.

In the face of empirical evidence contrary to the implicit tenet of labour market homogeneity as proposed by the neoclassical model,

a reconsideration of Canadian public policy options is urgently needed, particularly in light of the development of two very important trends. Firstly, there is a natural tendency for labour markets to become segmented if left on their own and therefore, policies which will help to heal the split in the structures of the market are required. This phenomenon was articulated by Cornwall (1977, p. 41) in the following statement:

> ...it should be stressed that segmented labour markets should be viewed as the natural outcome of a system of labour markets where human capital is firm-specific....a lack of wage competition is the only form of policy that is compatible with harmonious industrial relations. When cognitive skills are learned on the job, wage competition would result in a breakdown of production. The result is that segmented labour markets arise, even if potential employees are identical in the eyes of employers.

Secondly, Canada is suffering from inadequate growth in its primary and core labour markets while at the same time, a substantial proportion of the labour force is being forced into secondary and periphery employment. Intensified foreign competition and accelerating technological change are inducing a rapid restructuring of the economy that will make most medium skilled occupations obsolete in the coming decades. Blue collar workers displaced from their factories will be reduced to either menial, low-paying jobs or chronic unemployment. Consequently, the labour market will become increasingly polarized into a two-tier system with relatively few high-paying, high-skilled occupations coupled with an abundance of low-paying, low-skilled ones.[1]

In short, a definite movement towards secondary and periphery employment growth is underway. Many economists have already begun to note the rapid expansion of temporary help services, sub-contracting, part-time employment, job losses in large high-paying corporations, job creation in the typically low-paying small business sector, and strong service sector growth.[2] These trends in the Canadian labour market suggest that as work becomes less and less secure, so does the nature of primary and core employment. Consequently, primary and core sector jobs are increasingly being transformed into secondary and periphery sector ones.

At this point in the chapter, the following alternative public policies are recommended in order to assist that growing proportion of the Canadian labour force which is confined to a disadvantaged position in society.

(1) Facilitate the free movement of workers from the secondary and periphery labour markets into primary and core employment.

(2) Improve the quality of secondary and periphery employment by extending to workers in these segments, the various benefits which are characteristic of primary and core employment.

(3) Create more primary and core sector employment.

With respect to the first policy recommendation, the free movement of workers from the secondary and periphery labour market into primary and core employment can be facilitated through two general approaches. The first involves reducing the confinement structures or internal labour markets of the primary and core sectors

since they severely restrict open competition from the labour force at large. Hence, this action would ensure that the "rationing" system becomes both objective and fair.

Once the barriers to mobility have been removed, the second approach would require assisting the disadvantaged workers to adapt and succeed in primary and core sector employment. In this step, the human capital resource development systems needed are already in place to help workers advance within and across labour market segments. They merely need to be scaled-down to provide for only the most essential assistance such as remedial education, job-specific training, orientation to work, testing, counselling, referring, and other important supportive services.

The second policy recommendation requires that the quality of secondary and periphery employment be improved by extending to workers in these segments, the various benefits which are characteristic of primary and core sector employment. This can be achieved by stabilizing most of the secondary and periphery jobs and building into them the kind of career ladders, protection, working conditions and wage rates which predominate in the primary and core sectors. Expanding the presence of unions and collective bargaining in the secondary and periphery sectors will go a long way in this regard.

The third and final policy recommendation proposes that employment in the primary and core sector be expanded. Clearly, the cost of creating a high-wage primary or core sector job is extremely high when compared with the cost of creating a low-wage secondary or

periphery one. However, the long-term net cost of "good" job creation may be less than the cost of creating "bad" jobs, when consideration is given to the long-term indirect costs and benefits to society as a whole. Therefore, as Osterman (1982) has argued, the government should play a central role in this area by providing financial incentives to firms in order that they create the appropriate stable job structures.

In conclusion, the traditional human capital policies that alter the structure of labour supply have clearly not been effective in improving the earnings of disadvantaged workers because in themselves, they do not necessarily enable those in the secondary and periphery segments to enter the primary and core sectors. Thus, improving the characteristics of workers via human capital development alone will do little, if this is not accompanied by policies that alter the structure of labour demand. Ergo, a combination of both labour supply and demand policies are required if we are to expect any significant improvements in the earning capacity of disadvantaged workers in Canada.

Chapter V: Notes

For a discussion of specific future occupational changes in the Canadian labour market, consult the Employment and Immigration Canadian Occupational Projection System (1986). For U.S. predictions, see Austin (1986), Ehrbar (1983) and English and DeLouise (1983).

Additional information on future trends affecting the labour market in Canada can be found in the publications by the Ontario Task Force on Employment and New Technology (1985) and Employment and Immigration Canada (1981; 1983).

CHAPTER VI

SUMMARY AND CONCLUSION

The main objective of this study was to empirically determine if the segmentation hypothesis has any relevancy in the labour market for males in Canada. Using several semi-logarithmic regression models, statistically significant differences in earnings were found across both occupational and industrial labour market sectors. Specifically, conclusive differences in earnings were present across the primary upper tier and secondary segment within both the core and periphery sectors. In addition, substantial variation was also found across the core and periphery sector's primary upper and lower tiers.

On the other hand, differences amongst the two primary tiers within the core and periphery sectors, as well as between the secondary segments across these two same sectors, did not prove to be significant. To this extent, the empirical results produced were somewhat mixed. Nevertheless, the overall findings in this study both confirm and extend the conclusions of earlier investigations which for the most part, empirically support the hypothesis that Canadian labour markets are segmented.

From a public policy standpoint, this analysis suggests that the traditional emphasis on labour supply adjustments, through human capital development, has failed in improving the earnings and working conditions of disadvantaged workers in Canada. Therefore, a re-direction of policy which addresses the structural aspects of labour demand is required in order to remove the labour market barriers created by segmentation. Consequently, this study recommends three

major public policy alternatives to correct for the stated structural deficiencies. The first policy involves facilitating the free movement of workers from the secondary and periphery labour markets into primary and core employment. The second policy requires improving the quality of secondary and periphery employment by extending to workers in these segments, the various benefits which are characteristic of the primary and core segments. The third and final policy alternative recommends the creation of additional primary and core sector employment.

Overall, the theory of labour market segmentation has proven to be an extremely useful concept in describing the structure of the labour market in Canada. Moreover, it has provided new insights in the importance of human capital enhancement. As such, the segmentation approach has emphasized that low wages are largely the result of the characteristics of the labour market in which workers operate, rather than the characteristics of the workers themselves. Hence, the poverty of the working poor is mostly the fault of the economic system and not that of the individual workers.

The results of this study point to a need for continuing research in the area, in order to better understand the origins and structures of the Canadian labour market. Although countless possibilities exist in regards to suggesting further efforts and empirical work on labour market segmentation, an interesting option would certainly be to construct a more comprehensive and complete model that incorporates both males and females in the analysis. This may not only help to

resolve some of the inconclusive results obtained herein, but will also provide a more accurate representation of the interrelationships present in the actual labour market itself.

In conclusion, the previous simplistic neoclassical models, have led to a serious misspecification and misrepresentation of the social processes underlying individual earnings determination. As a result, the implementation of policy has been misleading and ineffective. In contrast, the notion of labour market segmentation appears to hold substantial promise as a new and separate theoretical concept aimed at identifying the structural aspects of the labour market as a whole.

APPENDIX

TABLE A: Socio-Economic Labour Market Division

TABLE B: Industrial Labour Market Division

TABLE C: Sample Means of Actual versus Potential Experience

TABLE A

Socio-Economic Labour Market Division*

(Component Occupations of Each Segment)

PRIMARY UPPER TIER

Accountants
Aeronautical Engineers
Architects
Biologists
Chemical Engineers
Chemists
Civil Engineers
Commissioned Officers
  Armed Forces
Dentists
Economists
General Managers
  Senior Officials
Geologists
Government Administrators
Lawyers
Judges and Magistrates
Managers - Science and
  Engineering
Mathematicians and
  Statisticians
Meteorologists
Writers
Optometrists
Osteopathic Chiropractors
Petroleum Engineers
Pharmacists
Physicians and Surgeons
Physicists
Pilots, Navigators and
  Flight Engineers
Secondary School Teachers
Systems Analysts
University Professors
Veterinarians

PRIMARY LOWER TIER

Actors
Advertising Salesmen
Aircraft Mechanics

PRIMARY LOWER TIER (Continued)

Architecture and Engineering
  Technicians
Boilermakers, Platers and Structural
  Metal Workers
Bookkeepers
Brick and Stone Masons
Bus Drivers
Business Service Salesmen
Cabinet and Wood Furniture Makers
Carpenters
Dental Hygienists
Dieticians
Opticians
Draughtsmen
Fabricat, Assem, Repair Electric,
  Electronic and Elect. Equipment
Fine Arts, School Teachers
Fire Fighters
Food and Beverage Preparers
Foremen
Funeral Directors
General Office Clerks
Glaziers
Hostess and Stewards
Inspectors and Regulatory Officers
  Government
Instructors and Training Officers
Insurance Salesmen
Librarians and Archivists
Locomotive Engineers
Longshoremen
Machinists
Postal Clerks
Mail Carriers
Managers, Hotel and Motel
Mechanics and Repairmen
Politicians
Metal Processing
Ministers of Religion
Musicians
Nurses

TABLE A (Concluded)

PRIMARY LOWER TIER (Continued)

Office Machine Operators
Painters and Decorators
Pipefitters and Plumbers
Policemen and Detectives
Printers and Engravers
Psychologists
Radio and T.V. Announcers
Real Estate Salesmen
Secretaries and Stenographers
Sheet Metal Workers
Social Workers
Sociologists and Anthropologists
Surveyors
Taxi Drivers
Telegraph and Telephone Operators
Tellers and Cashiers
Tool and Die Operators
Translators
Truck Drivers

SECONDARY

Babysitters
Barbers and Hairdressers
Elevator Operators
Fish Canning, Curing and Packing
Fabricat. Assembly and Repair, Wood Products
Fabricat, Assembly and Repair, Fur and Leather Products
Fishermen
Forestry and Logging
Furriers
Janitors, Charworkers and Cleaners
Knitting Occs.
Labourers, Pub. Admin. and Def.
Laundry and Drycleaning

SECONDARY (Continued)

Milliners, Hat and Cup Makers
Newsboys
Occs. in Labs and other Elem. Work, Processing
Occs. in Labs and other Elem. Work, Forestry and Logging
Occs. in Labs and other Elem. Work, Textiles
Occs. in Labs and other Elem. Work, Excavating, Grading and Paving
Occs. in Sport and Recreation
Paving, Surfacing and Rel. Occs.
Railway Stationmen and Trackmen
Sewing Machine Operators
Shoemaking and Repair
Tailors and Dressmakers
Textile Bleaching, Fibre Prep., Finishing, Processing, Spinning and Weaving

* There are 480 occupations that were sorted into the various segments; to cut down on space, only the principle ones are listed here.

TABLE B

Industrial Labour Market Division

CORE	PERIPHERY
Industries included are:	Industries included are:
(1) Utilities, Transportation and Communication	(1) Trade
(2) Finance, Insurance and Real Estate	(2) Construction
(3) Mining	(3) Personal, Business and Community Services
(4) Manufacturing, Durable Goods	(4) Agriculture
(5) Public Administration	(5) Manufacturing, Non-Durable Goods

TABLE C

Sample Means of Actual versus Potential Experience

	PRIMARY UPPER TIER	PRIMARY LOWER TIER	SECONDARY
CORE SECTOR:			
T (years)	18.19	21.49	22.93
Experience (years)	17.43	18.63	17.77
Difference (T-Experience)	.76	2.86	5.16
PERIPHERY SECTOR:			
T (years)	15.43	21.04	28.63
Experience (years)	14.89	17.99	23.85
Difference (T-Experience)	.54	3.05	4.78

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