ETHNICITY AND EARNINGS

An assessment of the white-native earnings differential among males employed full-time, full-year.

by

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To:

My friends from Sudbury for always being supportive;
My parents for giving me the best gift in life: the ability to dream;
Jaylyn Wong for helping me turn dreams into reality.

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ABSTRACT

Little study has been conducted on the white-native earnings differential in Canada. Only two studies by George & Kuhn (1994) and De Silva (1999) have addressed this issue. This thesis follows up on their studies, and expands on them by providing an initial assessment of regional differences within Canada. This thesis utilizes the 1996 Census Public Use Microdata File, and focuses on white and native males engaged in the full-time, full-year labour market of Canada, Ontario and British Columbia.

At the Canadian level of study, the earnings differential is significant at 29%. For Ontario, the earnings differential is smaller (23%), while in British Columbia the white-native earnings differential is larger than the Canadian figure at 35%. Differences in observable characteristics such as experience, place of residence, skill level, education, and language account for over three-quarters of the earnings differential in Canada, 85 per cent of the differential in Ontario, and less than 50 percent of the earnings differential in British Columbia. Of particular interest are the earnings premiums awarded to certain observable characteristics, notably education, which provide a basis for policy and program initiatives to address the issue of the white-native earnings differential.

ACKNOWLEDGMENTS

Introduction

The 1990's have seen a growth in the activity of natives and interest in native

issues. Articles about the extremely high rate of suicides among natives and the racial

violence in the aftermath of the Marshall ruling, which granted natives the right to fish

year round, moved the issues of native poverty and anti-native discrimination higher in

the public mind.

Even without the violence in Burnt Church N.B., which highlighted racial

intolerance, the marked poverty[1] of natives in Canada may be a good indication of anti-

native discrimination in the labour market. A group facing discrimination will have

lower earnings and a lower standard of living than the average person. Although

research on impoverished groups has been going on for some time in Canada, one group

that has received very little attention is also the group with the longest history of

discrimination- natives. Natives have faced discrimination from the moment white

settlers set foot in the New World. From the formation of Canada under the British North

America (BNA) Act in 1867 to after the creation of the Charter of Rights and Freedoms

in 1984, natives faced institutionalized discrimination in most aspects of Canadian

society. However, unlike other groups, the plight of natives and native poverty in Canada

has only recently been examined by economists. This has been due both to the social

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[1]There are no figures showing the percentage of natives living in poverty. However, the average real per capita income of natives in 1996 was $12,000 (Armstrong, 1999). Depending on family and community size, the 1996 LICO ranges from $11,839 to $43,634 (Webber, 1998). This means that the average native is only $162 from being below the LICO, regardless of his or her family and community size. By way of comparison, between 1986 and 1996 the average income (in constant 1996 dollars) for all Canadians rose from $17,700 to $18699, while native real income decreased by $900 from $12,900 to $12,000.

agenda, where natives are just starting to enter the national debate, and to the lack of detailed information on natives, which is now becoming available.

George & Kuhn (1994, using the 1986 census) were the first to assess the white-native wage gap and the potential for labour market discrimination against natives. Their findings show an earnings differential of 11%. A second study by De Silva (1999, using the 1991 census) shows a larger earnings differential at 17%. The objective of this paper is to utilize the 1996 Census data to update the previous studies with the most current data. In addition, this study will expand beyond the previous ones by providing a more detailed regional assessment of the earnings differentials and the possibility of discrimination. The rationale for a regional study is that the labour markets in each province are unique and may vary greatly from region to region in Canada. The regional analysis will be rudimentary, focusing only on Ontario and British Columbia. The reasons for choosing these two provinces are their similar economic structures in 1995 (Canada Yearbook 1995, pp. 206-211) and the equal relative size of the native communities in each province.

One point of clarification must be made before starting out. There are a variety of ways that discrimination may be practiced before entering the labour market (e.g. in type of schooling) which will have an effect on earnings. For instance, discrimination in the type of occupation an individual is offered will have a definite impact on the types of earnings one can attain. For example, take a white and native who are identical, race is the only difference. The white is offered a managerial position while the native is offered employment on the production line. Generally, this occupational segregation

(discrimination) will lead to earnings differentials between the native and white individuals.

The 1995 census data indicate that 16.4 % of natives were employed full-time, full-year, 27.5% were employed part-time, part-year, and over half (56.1%) were jobless. For whites the distribution of employment breaks down into 33.1% full-time, full-year, 51.8% part-time or part-year, and only 15.1% jobless.[2] These figures would seem to indicate that there are barriers for natives wishing to enter the labour market, and for both natives and whites alike in gaining full-time, full-year employment.

Although recognizing the potential to discriminate indirectly in the labour market through, for example, occupational segregation, this study will focus only on those individuals working full-year full-time. With the full-year full-time employment being the pinnacle segment of the labour market, one would expect that discrimination will be earnings-based as all other filters barring natives in the labour market have been exhausted. That is to say, a native working full-year full-time will have already overcome the other forms of discrimination leaving employers with earnings as a means to discriminate between natives and whites.

Focusing only on the full-time, full-year individuals may seem too narrow; however, if discrimination exists in the labour market at its highest point, then it will also exist in other segments where employers have more instruments which they can use to discriminate against natives. That is to say, this study will be estimating the *minimum*

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[2] "Jobless" represents *all* individuals in the 15-65 age group who are either unemployed or not participating in the labour market. Thus part of the large difference between the percentage of whites and natives who are jobless reflects the lower native participation rate.

level of discrimination. If earnings of full-year, full-time employees are compared for

natives and whites, the differences in earnings over time show that natives lag behind

their white counterparts even in the full-year, full-time labour market. Figure 0.1 outlines

the lifetime earnings for both whites and natives. The curves are constructed by taking

the average earnings for white and native males for each age from 15-64. This provides a

primitive graphic of the lifetime earnings for white and native

Figure 0.1   Lifetime earnings for natives and whites employed-full, year full-time
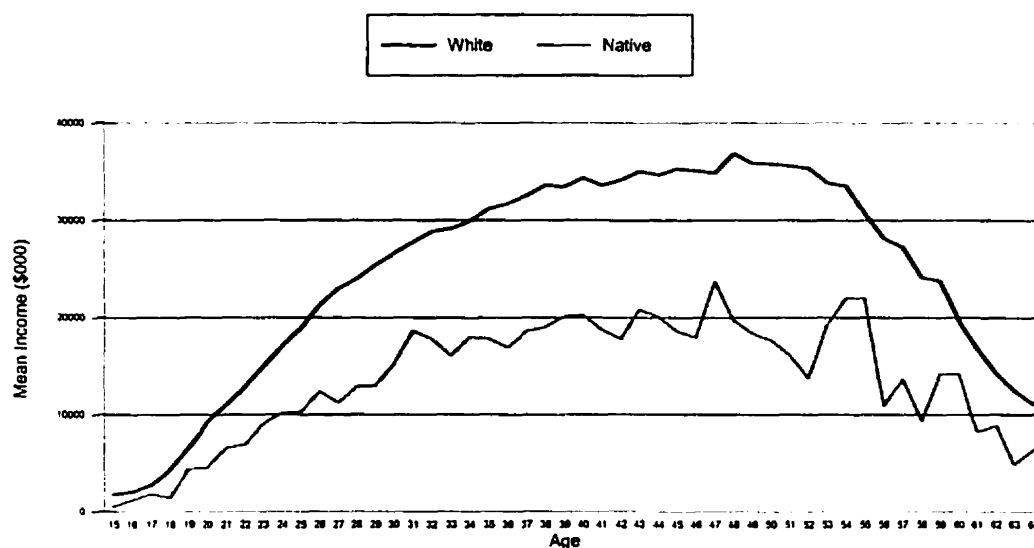
Source: 1996 Census Personal Use Microdata Files (PUMF)

males working full-year, full time. The figure clearly illustrates that the lifetime earnings

of natives are distinctly lower than the lifetime earnings of whites. Some of this earnings

differential could be due to differences in education, years of experience, or place of

residence. However, if we decompose the earnings differential into portions that can and

cannot be explained by differences in human capital, the portion that cannot be explained should be zero in the absence of discrimination. That is to say, if there is no discrimination, human capital measures should account for all of the differences between whites and natives in the full-time, full-year labour market.

The remainder of this thesis is set out in the following manner. **Chapter one** undertakes a discussion of economics and discrimination. The chapter opens with an overview of discrimination and then discusses how economic theory tries to explain labour market discrimination. The chapter concludes with a brief discussion of how discrimination in the labour market could affect the Canadian economy.

The focus of **Chapter two** is more technical. The chapter opens with a discussion of the data and sample selected. A detailed discussion of the model is next, and is followed by a discussion of the variables used in the model. The chapter concludes with an overview of the limitations of this study.

The **third Chapter** outlines results and provides interpretation based on the theory and methodology outlined in the previous two chapters. The summary and conclusions are presented in **Chapter four,** along with policy recommendations based on the results discussed in chapter three.

Chapter 1

Economic Theories of Discrimination

A study, like a house, needs a solid foundation and frame. In economics, theory represents the foundation and framing plan for the study. The theoretical basis of a study supports and directs the quantitative analysis while laying the basis for interpretation of the results. The first part of this chapter outlines the neo-classical theory of earnings in the labour market. From there, this chapter surveys some alternative positions on the economic theory of discrimination.

1.1   A Theory of Earnings

The neo-classical economic approach argues that all individuals earn the value of their marginal product. That is to say, a worker earns the marginal value added of his or her input to the overall product. The major conditions that need to be met for this theory to hold are 1) all markets are purely competitive; 2) firms have perfect information about individuals productivity.

These do not seem particularly reasonable conditions since firms do not have perfect information on an individual's productivity, nor do most firms operate in perfectly competitive environments. As a result, an individual's productivity is almost impossible to calculate. Thus, rather than trying to measure output, neo-classical economists attempting to estimate productivity focus upon the inputs used. The common approach to estimating the potential productivity of an individual (and thereby estimating the earnings

of the individual) is to use the human capital model. Human Capital theory states that an individual's productivity, as measured by price (labour market earnings) is dependent upon human capital and socioeconomic influences. Human capital is measured in terms of formal education and on the job education. Thus, the higher the level of education, or greater the number of years working at a specific job, the greater the individual's productivity.

In addition, the theory recognizes that factors outside the labour market have an impact on an individual's productivity. For instance, the higher earnings of married males is attributed to gender roles outside the labour market. This concept assumes that a man will be more productive because after finishing work he does not have to go home and complete housework. As a result, he may have more time to relax, and be better rested for work the next day, making him more productive than a man who is single. The only drawback of Human Capital theory is that the variables used to infer productivity are just proxies and are subject to measurement error.

1.2   Economics and Discrimination

Discrimination is an issue that is not easily defined, nor is it solely confined to the labour market. Discrimination against a group in society could take place in the legal system, in social values and attitudes, and in government legislation. In addition, some of the factors of present day poverty could be the result of past discrimination. For instance, discriminatory attitudes against natives by the European colonists led the Canadian government to displace natives from their traditional areas to well defined reserves. The

problem is that reserves are geographically isolated and, in general, distant from Canada's urban centres. Thus, despite the fact that natives are no longer forced to reside on reserves to maintain their identity, the location of most of the native population away from urban labour centres reduces their employment opportunities. Clearly, past discrimination will have an impact on the present situation. Additionally, this example shows how non-labour market discrimination may spill over into the labour market.

There can also be discrimination in the labour market itself. Economic discrimination in the labour market is defined as differences in earnings or employment between individuals of equal productivity. Hence the question remains, how does economic theory explain why such discrimination might occur?

1.3   Becker

One of the pioneers in studying labour market discrimination is Gary Becker (1959). Becker addressed the issue with an analogy to trade economics, equating the different racial groups to countries and the labour market as the international market for a common commodity. Becker suggested discrimination in the labour market acts like a tariff in international trade. Thus, discrimination in the form of barriers to entry for blacks in the US (the focus of Becker's study) produced similar effects to a nation imposing a tariff. Under the discrimination free (free trade) scenario each cultural group would trade their relatively abundant good for their relatively scarce good. Utility would be maximized, globally, when the marginal productivity of both groups was equal. Because of the "tariff effect," discrimination leads to a situation where the marginal

productivities of the different groups in society are different. This in turn leads to lower

economic production, both overall and for each group, due to the inefficient distribution

of resources.

Becker introduced a *discrimination coefficient* as a method of showing the

downward shift in demand for labour of blacks (or in this case natives). This shift in

demand will affect the income and employment of the group being discriminated against.

For example, if natives are discriminated against, the demand for their labour falls.

Depending on the elasticity of native labour supply, either incomes or employment will

be more severely affected. Figures 1.1 through 1.3 illustrate the effects of discrimination

against natives. In each case (figure) the initial situation is no discrimination, with

demand for white and native labour being equal. This is represented by the line D.

Where the supply of labour (S) intersects with the demand, the wage rate and

employment rate are set. For the following figures D* represents the demand for native

labour in the face of discrimination. The market clearing earnings and employment are

represented by w and n respectively. After the introduction of discrimination, the

earnings and employment for natives will shift to a new equilibrium represented by w*

for earnings and n* for employment.

Figure 1.1 assumes that the labour supply of natives is perfectly elastic. That is,

as demand for native labour decreases, so does the quantity supplied by natives. Thus,

discrimination shifts the demand for native labour from **D** to **D***. The wage rate for

natives does not change, remaining equal to that of whites. However the overall number

of natives employed is reduced from **n** to **n***. The result is that producers lose some of

their surplus (represented by triangle **abc**).

Figure 1.2 assumes the supply of labour is perfectly inelastic. Here discrimination lowers demand from **D** to **D*** again, but because the supply of labour does not change, the wages of natives fall from **w** to **w***. This reduction in wages lowers the native wage below their marginal product. As a result rectangle **dew*w** represents the difference between the marginal productivity of natives and their wage rate. Assuming that whites and natives are equally productive, this difference represents the underpayment of native labour in relation to its marginal productivity. To producers, the differential could be used to increase profits, and represents a gain in producer surplus.

Figure 1.1

Effects of Discrimination when labour supply is perfectly elastic.
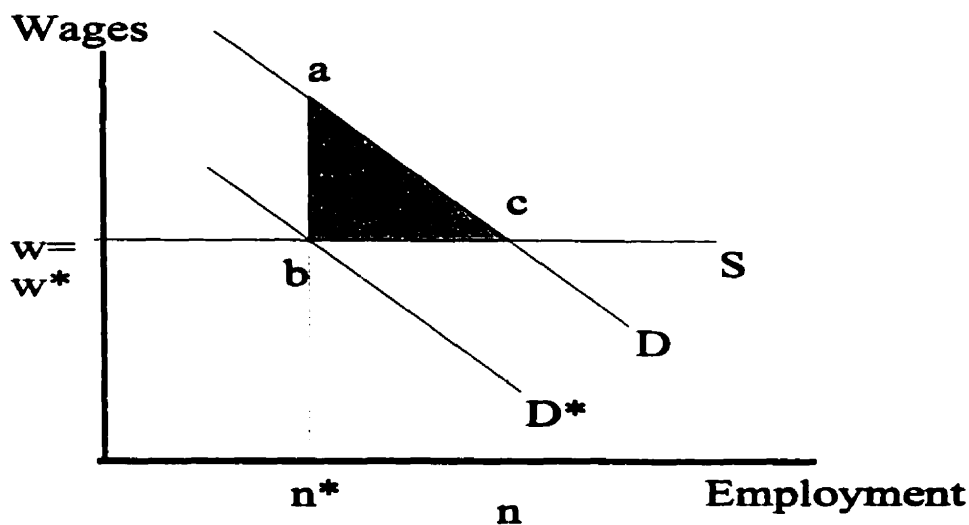
Figure 1.2

Effects of Discrimination when labour supply is perfectly inelastic.
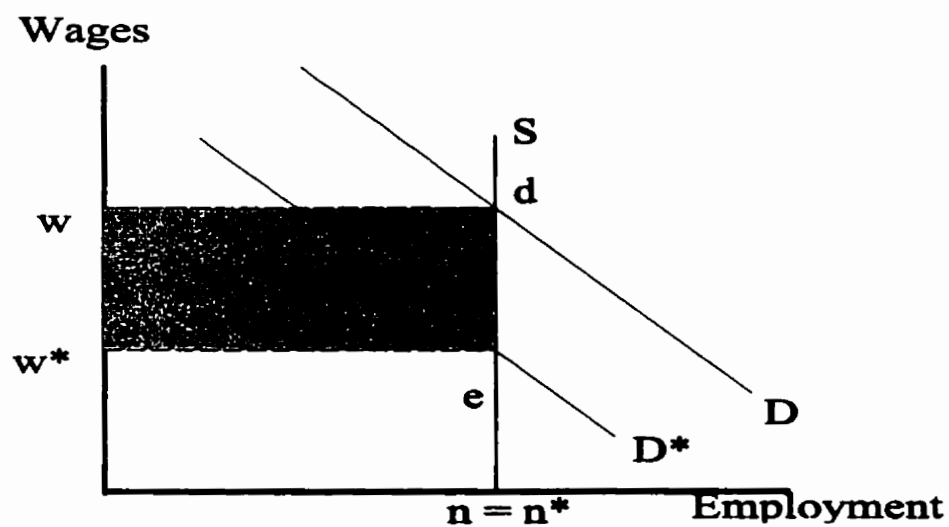
Figure 1.3

Effects of discrimination in a labour market that is not at either extreme.
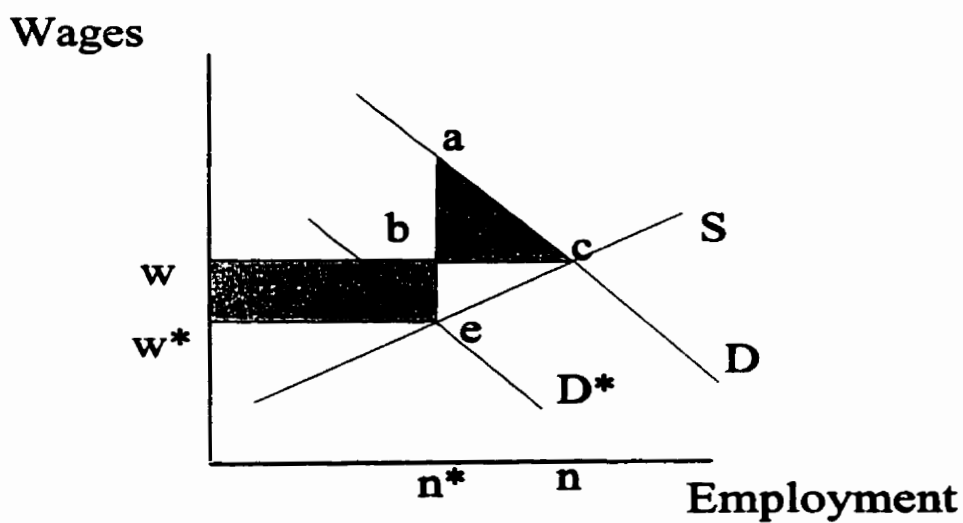
Figure 1.3 places the two previous extreme positions into a more realistic context where the elasticity of supply is neither perfectly elastic nor perfectly inelastic. Hence, the shift in demand for native labour as the result of discrimination will produce both gains and losses in producer surplus. The overall result of discrimination on producer surplus will, ceteris paribus, depend upon the elasticity of labour supply. Becker claims that any displacement of earnings or employment because of discrimination will be a temporary phenomenon as long as there are non-discriminating firms present.[3]

1.4   Neo-classical Economic Thought

Neo-classical economists argue that, since firms have no control over prices in the market, any firm that is inefficient will not be able to compete and will start to incur losses (see figure 1.1). These losses are the result of a failure of the firm to capture producer surplus, which is essential for the profitability of the firm. In a perfectly competitive market, all the consumer surplus must be captured to remain operating efficiently. For the firm that does not discriminate there are no losses of efficiency. In fact, being efficient allows them to continue to operate while the discriminating firms start to incur losses. Thus, firms that discriminate will either have to reverse their policies or be pushed from the market.

The case of discrimination causing lower wages is not much different (see figure 1.2). If firms discriminate against natives in the labour market, according to figure 1.2

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[3] It should also be noted that mainstream economic theory assumes that firms have perfect information about workers' productivity and firms have no control over prices in the market.

their incomes will be depressed. Non-discriminating firms, with perfect knowledge of worker productivity, can hire additional native labour for a wage below their marginal productivity, and acquire profits in excess of what the market would provide. Thus, all firms that are trying to maximize their profits will continue to demand native labour over white labour due to the fact that employing native labour will allow them to acquire more profits. However, as the demand for native labour increases, the wages paid to natives will also have to increase. Thus, profit-maximizing firms will continue to bid up native wages until they are equal with white wages once again.

As one can see, neo-classical economics argues that the non-discriminating firms, in their drive to maximize profits, will either push the discriminating firms out of the market or increase demand for native labour. In either case the outcome will be the same: natives and whites will end up back at the non-discrimination wage and employment rate. The only problem with neo-classical economic theory is that discrimination in the labour market has remained persistent over the years. The question then is, why?

1.5   Why does discrimination persist over time?

There are five responses to the question of why discrimination has persisted over time ranging from *consumer driven discrimination* to *crowding theory*. In the first two instances, the assumptions of firms being perfectly competitive and having perfect information are maintained. In the latter three cases, the above assumptions are relaxed (i.e. firms are no longer assumed to know how productive a person is and are assumed able to exercise some form of market power, influencing wether the prices for inputs

(labour) or the prices of output (goods)).

1) *Consumer driven discrimination.* Becker notes that individuals will accept the lower level of material welfare in return for the psychic gains from being separated from blacks (p. 66). These psychic benefits lead whites to demand segregation from natives. Thus the root of discrimination is not the firms but the consumers to whom the firms cater. Following the demands of white customers, the firm may not hire natives. If the supply of native labour is perfectly elastic (as in figure 1.2) the natives will exit the labour force and the wages of natives relative to whites will not change. However, to make up for the lost native labour, the firm must employ (perhaps) less efficient whites, which in turn reduces the efficiency of the firm's production which increases the firm's costs. Since it is the consumers that demand the segregation from natives, the firm can increase prices to cover the increased costs. As long as whites are willing to pay the increased prices - that is to say as long as the marginal cost for maintaining segregation equals the marginal benefits of segregation - firms will be able to operate.

2) *Firm gains from discrimination.* The second response is from Lester Thurow (1969), who points out that, according to Becker's model, firms that discriminate could show an overall gain through the use of discrimination. If the supply of labour is neither perfectly elastic or inelastic, then a firm discriminates against natives by first demanding fewer native employees, which drives down the native wage rate. Keeping a portion of natives at the lower wage rate (remembering that the lower native wage will be below their marginal product) allows the firm to capture the excess marginal productivity of the natives employed. Recalling figure 1.3, if the rectangle **bew*w** is larger in area than

triangle **abc**, then the firm gains from discrimination. Becker equated this type of action with a country employing an optimal tariff. Thus, as long as the discriminating firm gains more from the lower wages of natives than it loses from inefficiencies, the firm will continue to operate without being subjected to the losses that neo-classical theory predicts will plague a discriminating firm. Even if other non-discriminating firms compete for native labour, raising the wages of natives, the profits the firm accrues over the efficiency losses allows the discriminating firms to operate longer despite the fact that they are discriminating. The longer the discriminating firms continue to operate, the longer the situation in the labour market will persist.

The following three responses assume that there are imperfect markets and imperfect information. The relaxing of the neo-classical assumptions means that discrimination could be both less obvious and more ubiquitous. Discrimination presently is defined as just the firm refusing to hire an individual or offering them less, on the basis of their racial characteristics. In the neo-classical case the discrimination is clear cut; however, with imperfect information and the ability of firms to exercise market power, discrimination is harder to define and could become more widespread.

3) *Statistical discrimination*. Of greater importance to the discussion on discrimination is the fact that perfect information about an individual's productivity is not available. With imperfect information about an individual's productivity level, firms need to use other indicators of productivity. Firms may use education, previous experience, gender, and race to gauge the productivity of new employees. The fewer sources of information the firm has to base its decision upon, the greater the probability

that the firm will use race as a signal. Therefore it is in the best interest of both firms and potential employees for the employees to provide as much information as possible to firms. However, even with information, because the individual's true productivity is unknown, there is still room for discrimination.

Differences in education and experience may be good indicators of a person's productivity, but faced with individuals with identical education and experience, a firm may make the choice on the grounds of race. This type of discrimination may not be the result of a racial bias on the part of the manager or firm; rather the racial decision may be based upon the mean characteristics of each racial group. Therefore, between a white and a native with equal education and experience, the white may be taken over the native because, to the firm, the "average" white has higher education and experience than the "average" native, so choosing the white candidate is "statistically" safer as a choice, as in general whites are more productive than natives (Gunderson & Riddell).[4]

This type of statistical discrimination may take place even when a native is hired. The firm, based on the lower average productivity of natives in relation to whites, may offer the native the position at a lower wage rate than would be offered the white individual. An illustration of this comes from a 1929 advertisement for employment stating: "White Workers $24; Black Workers $20."[5] This represents an extreme case, but the result is the same.

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[4]For a more comprehensive discussion of the issue see Aigner, D. and G. Cain. "Statistical theories of discrimination in labour markets." *International Labour Relations Review* 30 (January 1972) 175-189.

[5]Ashenfelter, O., Journal of Human Resources, 1970.

4) *Crowding hypothesis.* Crowding is where the firm may place individuals into a specific category or occupation based on their ethnic background. Known as 'crowding theory' (Bergmann, 1971) the practice stems from social and individual prejudices that assign racial classes to specific types of work. A gender example of this is in the way society defines "women's" and "men's" work. A firm's policies may lead to crowding resulting in a high concentration of natives in specific occupations. The oversupply of natives in these occupations lowers their marginal productivity and thus their earnings. Whites, who do not face occupational barriers, inhabit a more diverse range of occupations and are thus more scarce, leading to higher marginal products, and higher earnings. By way of example, a firm might only place natives on the assembly line while whites are employed in all occupational categories. This may be done on the basis of the firm's taste for discrimination or on the basis of "statistical" discrimination. The result is the same, despite whether the discrimination was intentional or unintentional: natives are herded into lower paying positions and end up with lower earnings.

5) *Market power.* The fact that firms can exercise market power means that any firm wishing to discriminate can do so with a lower probability of bankruptcy. Furthermore, the fact that firms can exercise market power results in the obfuscation of discrimination. Under the neo-classical model, discrimination could be discovered almost immediately, as the firms that discriminate will be less efficient than their competitors and have a significantly different rate of return than their competitors. Realistically, the owners of capital do not truly know what their return on capital should be. As a result, as long as they are happy with the rate of return, they will not question

the policies of the managers. Thus, managers with a taste for racial discrimination may not be discovered for a while, if at all, as the economic signals are non existent. For instance, if a manager is racially biassed, then his decisions on hiring and promotion may lead to a non-maximizing level of production. However, because the firm has market power, and the return on investment for the capital owners is within a couple of percent of their competitors, there is no alarm and the manager is not questioned on his policies. The one study that does assess a firm's market power and discrimination was conducted by Sheppard (1969). His study looked at the relationship between market power and the percentage of minorities in "white collar" (management) positions. His results show that, as the market power of firms increases, the percentage of minorities in "white collar" positions declines. This result is consistent across all sectors, save the public sector where stringent anti-discrimination legislation was already in place. Sheppard's results indicate that, as the market power of firms increases, their ability to discriminate increases, and that there are barriers to higher paid occupations for minorities.

1.6   Implications of Discrimination

Discrimination affects the Canadian economy in three ways. The first way is through a loss of efficiency. Inefficient production leads to lower economic output and higher costs for firms, which means that the cost of economic goods for individuals increases due to lower aggregate supply. In turn, higher prices reduce consumer welfare, as individuals have fewer goods to meet their needs and wants.

The second implication is the loss of aggregate demand from the reduced earnings of those being discriminated against.[6] If an individual faces discrimination, then he or she is not earning the "true" (discrimination free) wage rate. As a result, these individuals have less income at their disposal, reducing their ability to satisfy their needs and wants, which leads to a reduced standard of living. As a group, the combined reduction in purchasing power may cause the aggregate demand in the economy to fall below its theoretical maximum, placing downward pressure on the Canadian economy. If the reduced earnings of the natives are transferred to whites, then the extra white demand could offset the reduced native demand for goods. The overall effect would depend upon the marginal propensity to consume (MPC) of each group. If natives have a higher MPC than whites, discrimination will lead to reduced aggregate demand. If the MPCs for natives and whites are equal, there will be no change in aggregate demand as a result of labour market discrimination. If the MPC for whites is greater than the MPC for natives, then discrimination will lead to increased aggregate demand, inflating the Canadian economy.

Third, labour market discrimination may generate negative externalities in civil society. Beyond the ideals of equity and justice, where poverty as a result of discrimination leads to a reduction in social welfare, the poverty generated by labour market discrimination may lead to an increase in criminal activity as those who are

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[6]This assumes that people being discriminated against face an earnings penalty on the basis of their racial heritage. Put another way, one must choose which earnings profile is the "true" earnings profile, which for this study is the national white earnings profile. Hence it is assumed that if there were no discrimination everybody would earn the "white" wage. This seems reasonable given the relatively small native population.

discriminated against try to fulfill their needs and wants. An impoverished person may steal in order to eat, an act that would not occur if the individual was not poor. With the increase in criminal activity, the state may have to increase its role of providing security. To achieve this end, the state will either have to reallocate its current resources, reducing spending in areas like infrastructure, or increase taxes. In either case, the state's decision would have economic consequences. In such a situation, the effects of discrimination are subtle, which mean they may not be considered.

In the context of this study, natives earning less than whites will have lower purchasing power than whites. For both groups in society, discrimination decreases output and raises prices, while reducing the purchasing power and welfare of natives. Although natives do not account for a large percentage of the Canadian population, making potential impacts on GDP less severe, the squalor of most Reserves and the poor social conditions of natives are well documented and any increase in earnings could go a long way to increasing the natives' living conditions.

1.7 Summary

Discrimination is an elusive concept to define and measure. There are many areas where discrimination could be practised, and yet there are no hard lines demarking what is and what is not discrimination. In the labour market, this is also true. Racial discrimination can take the form of refusal to hire, refusal to promote, differences in working conditions or benefits, occupational segregation, the hours or weeks of employment, and/or differential wages. To completely measure discrimination in the

labour market would involve a lengthy and tedious process of reviewing all hiring,

promotion, and wage offering in every firm for every employee. This would be a

monumental and costly endeavour, as there are no direct data currently available.

However, the Oaxaca (1973) decomposition methodology provides a way of assessing

whether individuals with the same "human capital" receive the same earnings. This

method is discussed in Chapter 2.

Chapter 2

Methodology

To be credible, all research should follow a consistent methodology. The outline, construction and implementation of this methodology are all important and will have an impact on the results. Like a recipe, if you change an ingredient, the finished product changes. That is, changing variables or methods will affect the results of the study. This chapter focuses on the technical aspects of the study, from the data used to potential problems. One major limitation of this study and its construction was the data available. A second potential problem with this study arises from the sample selected. However unlike the former, this limitation can be tested and corrected for.

The chapter outlines the data and sample used in section 2.1. Section 2.2 is dedicated to a discussion of the estimation and decomposition procedures used to estimate the potential for discrimination. Section 2.3 outlines the problem and correction methodology for biases arising from the sample selection. Section 2.4 outlines and describes the variables used in the study with section 2.5 summarizing the limitations faced by this study.

2.1   Data and Sample Specifications

The data used for this study come from the 1996 Canadian Census microdata set. The complete set includes 792,448 Canadians, representing 2.6% of the total Canadian population.   This paper focuses only on males with positive labour market earnings,

aged 15 to 64, who are not engaged in full-time education. The sample is further

restricted to exclude non-native visible minorities, immigrants and individuals who live

in the Territories, which leaves a total sample of 114,507 individuals.

Each of the restrictions in the sample population serves a purpose. First and

foremost is the restriction of individuals employed part-time part-year. Blackmore (1984)

and Card (1992) claim that firms may discriminate through segregation of workers

between full-time and part-time positions. Thus, inclusion of part-time work as an

explanatory variable would then mask the true extent of discrimination because one

would need to control for the number of hours worked, which to a part-time employee

would be small, reducing the overall amount of potential discrimination from

occupational segregation. The assumption when including part-year part-time workers is

that these individuals choose not to work full-time full-year. However, occupational

segregation could be practiced by the firm which casts doubt on the assumption of

personal choice. As a result, including individuals working part-time part-year may

mask the extent of discrimination in earnings, as discrimination may be a major factor in

the full/part divide. The result of this masking would be an underestimation of the

potential for discrimination in the labour market To avoid uncertainty over the reasons

for part-time part-year employment and to avoid the masking of discrimination, this study

focuses only on individuals employed full-year, full-time. It is recognized that

discrimination in the form of restriction to part-time employment also needs to be studied.

Second, the exclusion of non-native minorities is to ensure that only the white-

native earnings differential is assessed. Other minorities may face some form of earnings

gap and discrimination in relation to whites. Accordingly, native groups may face an

earnings differential with some other minority group in Canada. To avoid attaining an

estimate that is skewed due to the introduction of a subset of individuals that also face

discrimination, all non-native minorities are excluded from the study.

Immigrants are removed from the study to avoid the biasing effects of white

immigration on the earnings differential and decomposition. Pendakur & Pendakur

(1998) note that white immigrants earn a higher average salary than native-born Canadian

whites (table 1, page 525). Given that 13% of whites are immigrant, compared with only

1% of natives, not addressing the issue of immigration would leave a large potential for

bias.

There are two ways to eliminate the effects of immigration in the model. The first

is to include immigration as an independent variable. This is generally the prudent choice

as it allows the researcher to determine the extent and significance of immigration on

earnings. However, in the case of natives, the negligible immigration leads to a very

small number of observations for the variable, which could lead to biased results. This

leaves the second method for controlling the effects of immigration: drop them from the

sample. By removing them from the sample, the effect of immigration on the earnings

differential is removed. This removes any bias in the white-native earnings differentials

due to higher rates of immigration among whites.

Full-time students are excluded from the study to limit potential biases in the

results. For students, enrollment in full-time study implies that the student is not

presently working full-time if at all. Thus full-time students receive low earnings figures

which do not accurately reflect their true labour market position. In addition, the census questionnaire provides only the highest degree the person has attained. While still in the process of learning, a student may have a low income and an under-represented education. The result is to undervalue the coefficient for education which would increase the potential for discrimination in the decomposition.

Females are excluded to simplify the analysis. Women have more complex labour market issues than men. With exits from the labour market for child-care and elder-care, females acquire less experience than their male counterparts, which has an impact on the earnings potential of females. In addition, gender discrimination against women is well documented. Thus, when calculating the unexplained portion of the earnings differential, one will not be able to determine if the discrimination against native females is because they are female or because they are native. The difference may have a large impact on the types of policies that the government may undertake in addressing the issue. Thus, to address racial discrimination against natives, it is best to remove the potential for gender discrimination from the study.

It may not seem logical to exclude the Territories, as a large percentage of the native population resides there; however, due to the wage premiums whites receive for relocating to the Territories, some bias would be introduced into the earnings regressions which could lead to the overestimation of earnings differentials. For this reason, George and Kuhn (1994) exclude the Territories from their initial study, and return to them later. Their results show that white males are awarded a huge earnings premium for working in the north compared to natives (George & Kuhn, table 12, page 40). With such a large

earnings differential for the north, the inclusion of individuals would widen the earnings

gap. Indeed, the fact that white individuals relocate to the north may imply a selection

bias, as whites often only relocate to the north to take advantage of large earnings

premiums.

Compounding the issue are the differences between the provinces and Territories

in terms of land and resource control, with the Territories' land resources being

administered by the Federal government and the Provinces governing their own

resources. Hence, earnings and income support are quite different in the north than in the

rest of Canada. Imputing the effects of these differences may not be possible. Thus, for

these reasons, the Territories were excluded from the study.

The restrictions used to refine the data set have benefits and costs. The benefit is

that the comparison is made more straightforward. The cost is to ignore what could be

important variables, or to make the sample unrepresentative of the whole population.

The bias caused through sample refinement is referred to in the literature as sample

selection bias, which will be discussed in the context of estimating the model in section

2.2.

2.2   Decomposition Methodology

The premise behind a decomposition is to ask: If natives and whites have the same

characteristics, are they compensated equally for those characteristics? The general

practice in calculating earnings differentials is to employ an Oaxaca (1973)

decomposition technique. The Oaxaca method takes all the known "human capital"

information about individuals and calculates the amount of the observed earnings difference that can be explained by the known information. This leaves a residual which includes unaccounted for variables and discrimination.

The procedure is straightforward. The first step is to estimate a separate earnings equation for each group. This is followed by calculating the mean of each characteristic for both natives and whites. To obtain the coefficients, an ordinary least squares regression, equation (1), is undertaken for each group. The regression follows Becker's human capital model, which states that an individual's earnings will be dependent upon the productivity-enhancing characteristics of the individual. This model has become the standard method for estimating the effects of personal characteristics on earnings, and is the model utilized in both the George-Kuhn (1994) and De Silva (1999) studies. For this study, the earnings equation is:

(1) Earnings = f(Experience, Residence, Language, Occupation, Education) + U1

where: Earnings is the natural log of annual earnings; Experience is the potential number of years of labour force activity calculated by taking the person's age and subtracting their number of years of school plus six; Residence is a dummy variable to identify individuals living in urban areas; Language is a dummy variable equal to one if the individual is bilingual (English and French) or unilingual; Occupation represents the skill level (professional, skilled, low-skilled, or unskilled) of the individual; and, Education is a measure of the level of formal schooling achieved; U represents the "residual" or error

term.

The third step is to decompose the earnings differential into its explained and unexplained portions. The standard Oaxaca (1979) decomposition approach utilizes the mean characteristics and estimated coefficients for each group. The raw earnings gap between groups, shown in equation (2), can be written:

$$(2) \qquad LnW^w\text{-}LnW^n = \beta^w X^w\text{-}\beta^n X^n + (LnW^w\text{-}LnW^n - (\beta^w\text{-}\beta^n)(X^w\text{-}X^n))$$

where W is the earnings variable in natural log form and X is a vector of individual characteristics. Using the natural log of earnings means that β, the coefficients for the explanatory variables X, will be percentage changes in earnings for marginal changes in the X variables. The notation w and n represent whites and natives respectively. Equation (2) states in economic terms that the differences in earnings $(LnW^w\text{-}LnW^n)$ will be dependent upon the observed $(\beta^w X^w\text{-}\beta^n X^n)$ and unobserved $(LnW^w\text{-}LnW^n - (\beta^w\text{-}\beta^n)(X^w\text{-}X^n))$[7] differences in characteristics between natives and whites in the labour market.

In any decomposition of earnings differences, the "true wage" must be determined.[8] That is to say, in the absence of discrimination or market distortions, what would be the wage that individuals would earn? We can approach the problem in a variety of ways. One is to pool the earnings and take a weighted average. This produces

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[7] One should note that the unobserved characteristics is nothing more than the Discrimination Coefficient (DC) given in Appendix A.

[8] For greater detail on the subject of earnings functions in the labour market see Chapter 10 "Wage Determinants" by Robert J. Willis in O. Ashenfelter and R. Layard, eds., Handbook of Economics Volume I Amsterdam: North-Holland, 1986. pp. 525-599. Or, Gunderson, Morley et al. Labour Market Economics 4th edition Toronto: McGraw-Hill Publishers Ltd. 1998, pp. 416-460.

a pooled earnings profile which is assumed to be the discrimination-free earnings profile. This "discrimination-free" earnings profile will vary depending on the relative sample sizes and earnings of each group. This method is rejected here for two reasons. First, the native and white communities in Canada vary greatly in population size, making the weighted average earnings profile very close to the white average earnings profile. Second, previous studies on the white-native earnings differential do not follow this approach; for this study to do so would make comparisons of results across studies more difficult.

A second method, the one used in the general literature, is to assume that one of the groups represents the true earnings profile. For this study, one would choose either the white or the native earnings profile as the one that represents the discrimination-free earnings profile. Natives have the lowest earnings of any racial group in Canada, so the use of their earnings profile would imply that whites attain large wage premiums on the basis of their characteristics. In addition, the natives comprise a small portion of the Canadian population and thus may not be representative of the whole society. By using the white premium as the true earnings profile, the assumption is made that natives face an earnings penalty based on their characteristics. With whites in Canada being the largest population and the most affluent, it may be a better representation of the true earnings profile for Canada. In addition, with such a large sample the white earnings profile may be a more accurate measure of market earnings.

Since most studies on earnings differentials use the white earnings profile as the true profile, doing the same will make comparisons across studies easier. Therefore, this

study uses white earnings as the discrimination-free earnings profile. The decomposition of the earnings differential between the explained and unexplained portions will use the white regression coefficients.

With the assumption that the white earnings profile represents the true earnings profile, the second part of equation (2) becomes redundant, as one does not need to calculate the difference between each group and the true earnings profile. Also, the assumption that the white earnings profile is the true earnings profile means that the native coefficients are no longer necessary. As a result decomposition is calculated according to equation (2a) where (LnW^w-LnW^n) is the actual earnings differential, and $(\beta^w(X^w-X^n))$ represents the difference in earnings value due to differences in the mean characteristics between whites and natives.

(2a) $LnW^w-LnW^n = \beta^w(X^w-X^n) + (LnW^w-LnW^n - \beta^w(X^w-X^n))$

In equation (2a), earnings are expressed in natural log form. To make interpretation easier, we will change the decomposition from numerical values into percentage values. Thus, by dividing the entire equation by LnW^w-LnW^n and undertaking a little algebra, we derive equations (3) and (4)[9], which represent, respectively, the percentage of the earnings differential that can be explained by differences in characteristics, and the percentage that cannot be explained by these differences

(3) $\Theta = \dfrac{\beta^w(X^w-X^n)}{LnW^w-LnW^n}$

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[9]For a complete derivation of the equations see Appendix A.

$$(4) \quad 1 - \Theta = \frac{LnW^w - LnW^n - \beta^w(X^w - X^n)}{LnW^w - LnW^n}$$

Θ represents the percentage of the earnings differential that can be explained by the differences in characteristics between natives and whites. Accordingly $1-\Theta$ represents the proportion of the earnings differential that cannot be explained.

The reason that the potential for discrimination is calculated as a residual is due to the nature of the information available. If perfect information were available, then each individual's marginal productivity would be known, and the difference between the marginal product and the wage of the individual would be the extent of discrimination. However, perfect information is not available, which leads to the problems of determining marginal product and controlling for differences in it. One can use the determinants of productivity, such as education and experience, as a proxy for the individual's productivity. Since the wages and proxies are observed, subtracting the differences in proxies between groups from the differences in wages yields a residual portion which cannot be explained.

As noted at the end of section 2.1, the restrictions on the sample used may lead to sample selection bias, where the sample is not representative of the general population. This problem must be addressed.

2.3   Sample Selection Correction

The method of selecting the sample may lead to biassed results. That is to say, the characteristics of full-time, full-year workers may not be representative of the entire labour market population. To test for and correct this sample selectivity bias the Heckman two-step correction for sample selection bias is used. The first step is to estimate the probability of selecting an individual into the sample group.[10] This involves estimating a probit equation for both the white and native groups, to determine the probability that an individual with a given set of characteristics is employed full-year full-time. The second step involves the estimation of the earnings equation for the subset of individuals employed full-time, full-year. For the Heckman procedure to work, the probit model must include variables that are not used in the original regression, but have an impact on the selection into the sample. The problem is in specifying these variables as it is difficult to determine what may influence the probability that an individual will work full-time, full-year but not influence his or her earnings.[11]

George and Kuhn (1994) use the age and age squared of the individual, spousal income, and the presence of children[12] as the probit instruments. De Silva uses (1999) uses social assistance, employment insurance, and other government transfers as instruments in the probit. For this study, the age and age squared, marital status, and

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[10] Keep in mind that the sample group for this study is males employed full-year, full-time.

[11] De Silva (1999) notes that correcting for sample selection bias produces highly variable results as economic theory provides little guidance on what instruments to use.

[12] George and Kuhn face the same problem as this author over child variables as the Census does not assign any children to males. That is all male individuals have a "not applicable" value for the child variables. Greater accuracy would be attained if Statistics Canada reported the presence of children for males as well as females.

immigration status are used as the instruments as all are readily available. With such different instruments, one would expect the results to vary greatly. Thus, as one should gather from the discussion, there are potential problems with the use of instruments which undermine confidence in the results that the Heckman procedure produces.

The crucial test of sample selection bias is the statistical significance of the variable lambda (λ). Lambda represents, in mathematical terms, the ratio of the standard normal distribution to the cumulative distribution function. As the ratio approaches 1, the value of lambda approaches zero. If the estimated coefficient of λ is not significantly different from zero, the selected sample could be considered representative of the entire population. On the other hand, if λ is significantly different from zero, then the characteristics of the sample are different from the characteristics of the general population and bias exists.

Miller (1987) shows that the sample selectivity correction can be used as a measure of the wage offers that individuals receive. Since firms may discriminate by offering different wages to individuals on the basis of race at the time of hiring, the question of differences between observed wages and offered wages is important. The assumption of the Miller model is that the observed wages are what was initially offered and do not change over time.[13] Hence, if λ is not different from zero then the observed and offered wages are the same, and there is no potential for discrimination in wage

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[13]The assumption may seem flawed; however, if firms discriminated in initial wage offerings, natives being offered a lower wage may decline the offer to work either part time or not at all. One other consideration for Miller's assumption is that firms may practice discrimination through promotion and advancement rather than through wages.

offers. On the other hand, if λ is significantly different from zero, then the possibility of discrimination exists between the offered and observed wages of individuals. Like the differential in earnings, the differential in wage offers can be decomposed into explained and unexplained portions.

By adding the portion of the earnings difference due to sample selectivity bias to the earnings differential equation already observed, one can determine the difference in wage offers between whites and natives.

(5) $$\rho = \frac{\beta^w(X^w-X^n) + \gamma^w(\lambda^w-\lambda^n)}{LnW^w-LnW^n}$$

(6) $$1-\rho = \frac{LnW^w-LnW^n - (\beta^w(X^w-X^n) + \gamma^w(\lambda^w-\lambda^n))}{LnW^w-LnW^n}$$

where equations (5) and (6) represent the earnings decompositions from equations (3) and (4) respectively, with the addition of differences in the results for the potential sample selection bias, represented by $\gamma^w(\lambda^w-\lambda^n)$. Here, ρ represents the difference in wage offers that can be explained by differences in characteristics between natives and whites, with $1-\rho$ representing the portion of the difference in wage offers that can be explained by differences in characteristics.

2.4   Description of the Variables

Earnings is the natural logarithm of wages and salaries. Since this is a study of labour market discrimination, self-employed individuals are excluded. Nevertheless, a possible bias may result from the exclusion of self- employed individuals. Both the white and native groups have individuals with self-employment income. The white group may

have a higher percentage of self-employment due to government policy that promotes immigration of entrepreneurs, which the native population does not take advantage of due to negligible immigration, or native entrepreneurs may face credit constraints that their white counterparts do not. Either way, the exclusion of self-employment could reduce the earnings profile of each group. With the white group having a much larger exclusion, the earnings differential may be under-reported, depending on whether the self-employed individuals earned positive or negative incomes.

Experience is a measure of human capital which enters as two variables: the calculated experience, and the calculated experience squared. The latter allows one to determine the marginal rate of decrease in additional earnings for each additional year of experience. The variable is constructed by taking the person's age, less years of schooling less six. This proxy for experience is not totally accurate, as the census questionnaire limits the range of years available to be entered. For instance, the census questionnaire counts years of schooling from 4-13 and 17 & 18. Thus for an individual that completes high school (12 or 13 years of study) but drops out after second year of university or college (14 or 15 years of study), that individual must choose or be assigned either 13 years of schooling, overestimating their labour market experience, or 17 years of schooling thereby underestimating their labour market experience. Furthermore, the census limit of 18 years of schooling to be reported may overestimate the individual's calculated experience for those who enroll in formal study for more than 18 years.

A second potential proxy for an individual's labour market experience, in De Silva's (1999) article, is age and age squared instead of imputed experience. However,

as the results (table 3.1, p. 43) show, natives and whites differ by several years in age, but are identical in experience. Hence, despite the fact that whites are older than natives, both groups are equally experienced in the labour market.

If age were to be used rather than experience, a portion of the earnings differential would be considered explained by age, which might not be explained in reality as experience is identical. That is, the use of age instead of experience would reduce the proportion of the differential attributable to discrimination despite the fact that both natives and whites have an equal amount of experience. Substituting age for experience didn't change the proportions of the explained and residual portions of the earnings decomposition. However, the coefficients on the variables changed. Using age increased the experience coefficient, and reduced all the other coefficient values. This result would indicate that either measure of experience could be used with little impact on the results.

The underlying assumption of the "potential experience" proxy is that an individual enters the workforce right after the completion of his or her education or immigration[14]. There is evidence that the assumption is wrong in both cases. Immigrants, despite being better educated, still face problems of integration after five years (Statistics Canada, 1998a & McKinnon, 1999b),[15] the length of the school-to-work transition is increasing (Lowe, 1995), and individuals are changing jobs more frequently

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[14]This assumption poses problems for the estimation of returns to experience for women as women, due to family responsibilities may have lengthy and/or frequent exits from the labour market, which underestimates the return to labour market experience that females receive. For this study, the focus is on males so the problem is avoided; however, if one includes females in the study they should note, and try to control for, the problems with using the experience proxy with females.

[15]A contrary finding was made by Bloom et. al. (1995) which showed that older immigrants integrate quite well into Canadian society.

than twenty years ago.

Furthermore, discrimination may lead to breaks in labour market participation; natives, having longer transition periods and more frequent labour market interruptions, may actually have less experience than whites. All of these things lead to reduced experience, as there will be breaks in the individual's employment. Hence, the experience variable should not be considered an absolute measure of labour market experience, but an upper bound on the potential labour market experience an individual has. Ideally, one would like to measure the frequency and duration of labour market interruptions. However, most data sets, including the one used here, do not contain the information necessary to measure this.

Education is an additional measure of human capital which is divided into five dummy variables (primary, secondary-incomplete, secondary-complete, trades and other, post-secondary-incomplete, university degree) representing the highest level of schooling an individual has completed.

There are two methods to estimate the economic returns to education. The first is to estimate the return for each additional year of education. This view regards each year of education as increasing the person's human capital, thus increasing the earnings premium for the individual. The alternative view holds that the actual achievement of each level of education is more important than the number of years spent learning (i.e. there is little difference in earnings potential between 15 and 16 years of education but a large difference in earnings potential between having or not having a BA). The construction of the variable for this study tries to balance between the two schools of

thought, by looking at the highest "level" of schooling attained, and includes levels for non-completion of education. Hence, the variable will account for the significance of attaining an additional certificate, and for failed attempts to attain a further certificate. The failed attempt represents an opportunity cost of labour market experience as the individual spent time in school rather than in the labour market. With the failure to attain the next certificate and the lost labour market experience, one can expect to see a negative earnings premium for failing to complete the next level of education as that individual has lost labour market experience.[16]

The control variable for education in this paper is "secondary-school certificate" because Canada guarantees a full education subsidy for participation in secondary education. In addition, studies by Vaillancourt (1996) and Brown & Corcoran (1996) conclude that there exists a relationship between the type of certificate attained and the type of occupation (which affects earnings) a person has in the labour force. This implies that differences in the educational attainment of whites and natives, in both the level and type of education, have an impact on the earnings differential between the two groups.[17]

Occupation is a set of dummy variables covering the four skill levels (professional, skilled, low-skilled, and unskilled) set out by Statistics Canada (1991). For this study the "skilled" workers category is used as the control variable. In other studies (Pendakur and Pendakur, 1995, 1998), the occupation variable was divided into as many

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This assumes that the additional years of education without the additional certificate has a lower labour market premium than the number of years of labour market experience.

[17] Determining the subject the individual studied is beyond the scope of this thesis. However, a study of the type of schooling undertaken (i.e. history, engineering, etc.) and its effect on the white-native earnings differential would be a worthy endeavour.

occupations as were listed (16 in the 1991 Census). The Pendakur approach, despite

having greater detail, was rejected for two reasons: the size of the sample and

administrative changes. With a small sample population for natives the subdivision into

myriad categories could lead to variables with too few observations to be significant.

The other problem was due to an administrative change in the Census. In 1991 there

were 16 occupational categories. In 1996 there were only 14, and not all of the new

categories are compatible with the old categories. Given the problems facing such an

endeavour, expanding the occupational variable may obfuscate the results and create

problems when trying to compare results with previous studies.

The use of occupational variables can be contentious, as several studies on labour

market segregation show that women face discrimination in the types of employment they

attain (Blackmore 1984, Card 1992). Known as "occupational segregation", this logic

can be applied to visible minorities. That is, if a large portion of natives is contained in

the lower earning occupational categories, then some of the discrimination may be due to

structural placement of natives in the labour force, which will be masked with the

inclusion of an occupational variable. Consequently, by assessing the racial components

of the occupational categories one may be able to infer the extent of any possible hidden

discrimination. For example, if one finds a disproportionate number of individuals from

a specific racial category employed in the "semi-skilled" or "low-skill" occupations with

the same experience and education of individuals in professional and skilled occupations,

one could reasonably select out that racial group for further study on potential

discrimination.

Language is a control variable used to account for differences in earnings due to knowledge, or lack of knowledge, of both of Canada's official languages. This is a binary variable, divided into individuals who are bilingual and individuals who are not, with bilingual as the base for comparison. Ideally, one would separate this variable into four categories representing Anglophones, Francophones, bilinguals, and Allophones, but some of those four variables would not contain sufficient observations to be statistically viable; hence, the use of a binary variable.

The language variable will be important depending upon the province of residence, industry, and occupation. In Quebec, an individual without at least a basic working knowledge of French may face barriers to employment. In addition, with the Canadian government being bilingual, most public sector employment (and a growing share of private sector employment) requires that the individual be fluently bilingual. Thus, depending on the occupation and industry, non-bilingual individuals may face barriers in the labour market which may reduce their earnings. Therefore, one would expect to see increased earnings for individuals who report that they are bilingual.

As Pendakur (1998) points out, census information is gathered through a self-reporting questionnaire. Bias could result from an over-reporting of fluency in English or French by individuals. Thus, by over-reporting language capabilities, the significance of language skills in the earnings differential will be underestimated. As a result, when decomposing the earnings differential, the over-reported language capabilities will lead to a lower "explained portion" which biases the results towards showing a higher possibility of discrimination.

Census Metropolitan Area is used to determine if the individual resides in an urban or rural area. One would expect that individuals living in more urbanized areas would earn more than their rural counterparts. Part of this difference results from the history of higher wages being paid to manufacturing and primary sector professions over service employees. The other part of the difference in earnings may represent the difference in costs of living (Statistics Canada, 1998b), as the costs for food and shelter are higher in urban areas.[18] These facts, combined with the increasing urbanization of Canada, led to the decision to use the urban category as the control variable.

2.5   Summary of Data Limitations

There are problems with the construction of the model to be estimated, with most relating to data limitations. The first problem arises out of lack of information. If one assumes that individuals can choose the industry they are employed in, controlling for the industry of employment will be important. This study excludes controlling for industry due to the small sample size for the native group which left some cells for the industrial variable with too few observations. Knowing that some of the differences in earnings may be due to differences in the industrial distributions, and not accounting for them, means that the potential for discrimination in earnings may be overestimated. On the other hand, if an individual has little or no choice over the industry he or she is employed in, controlling for industry may mask potential discrimination. If a person has little

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[18]A potential focus of future study could concentrate on the extent of, and underlying reasons for, the disparities between urban and rural areas.

choice over the industry of employment, firms with a taste for discrimination may practice occupational segregation by crowding natives into certain industries. As a result, the use of industry as a control variable could potentially mask some labour market discrimination.

The second problem stems from changes made by Statistics Canada between the 1991 and 1996 Censuses. The 1996 Census reduces the sample size by 100,000 individuals from the 1991 census. This change reduces the number of observations available. Second, Statistics Canada reorganized the occupational variable. Information available in the 1991 census is not available in the 1996 census.

The last problem resulting from this data set is the inability to assess the wage gap and actions of the variables over time for each group. This problem stems from the use of a cross-sectional data set which provides excellent information for estimation of earnings and earnings differences *at a given point in time*. Because cross-sectional data sets are constructed at fixed points in time, a bias could be introduced if, for example, the economy is in a high inflationary period. This would increase the hourly wage of workers, but if the effect of the inflation on earnings is not uniform across the groups, then the estimated earnings differential will be biassed. Ideally, one would like to utilize a panel or longitudinal data set, but no such data sets exist in any extensive form. However, some longitudinal and panel data sets have recently been created. Thus, although this study cannot assess or correct for such bias, future researchers will have the information available to make such corrections.

Chapter 3

Results

This chapter outlines and compares the results for Canada, Ontario, and British Columbia, in sections 3.1, 3.2, 3.3, and 3.4 respectively. The final section of the chapter is devoted to a discussion of the sample selection results. Interesting results exist at both the national and provincial levels. At the national level, the white-native earnings differential for males is similar to the results of previous studies for males, though the unexplained ("discrimination") portion is somewhat lower. Focusing on the regional analysis, British Columbia has both a wider white-native earnings differential and a larger potential for discrimination among males employed full-year, full-time than the national level. Ontario has a narrower white-native earnings differential than the Canadian average with a lower potential for discrimination than the national level.

3.1 Native and White Characteristics

Previous studies on the earnings differential of white and native males have focussed on the national level. At the national level, the two groups have quite different characteristics. In general, natives are more likely to be less educated, younger, single, unilingual English, and residing outside urban areas than their white counterparts (see table 3.1). According to Statistics Canada (1996 b), both whites and natives are becoming increasingly mobile, but the difference is that the white trend is to move from

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Table 3.1

Characteristics of native and white males, full-time full-year workers, 1996

Characteristic	Canada Native	White	Ontario Native	White	British Columbia Native	White
Earnings (wages & salaries)	33715	43075	36659	46089	35574	46408
Hours Worked (per week)	44.85	45.83	44.04	46.04	44.48	46.01
Weeks Worked (per year)	51.26	51.32	51.16	51.38	51.15	51.21
Age	38.17	40.30	38.27	40.50	38.50	40.56
Years of Experience	25.82	26.33	25.59	26.38	26.09	26.31
	%	%	%	%	%	%
Personal						
Married	70.03	76.88	67.68	76.96	66.95	75.03
Self-employed	8.03	13.36	7.49	1284	7.72	13.92
Immigrant	1.01	13.15	2.02	19.65	1.22	16.99
Urban Dweller	38.98	62.12	48.48	69.70	35.19	56.85
Anglophone	84.86	66.57	87.50	86.83	95.28	93.07
Francophone	2.41	10.99	0.00	0.15	0.00	0.00
Bilingual*	12.35	22.26	12.20	12.65	4.72	6.88
Allophone	0.39	0.18	0.31	0.38	0.00	0.00
Labour Force Activity						
High Skilled Occupations*	52.87	63.60	53.96	62.83	48.07	66.12
Low Skilled Occupations	47.13	36.40	46.04	37.17	51.93	33.88
Primary Industries	7.22	5.12	2.74	2.94	9.87	5.54
Manufacturing	17.94	23.14	24.70	28.25	19.31	17.68
Construction	6.29	5.69	4.88	5.87	9.87	8.63
Transport & Communication	13.82	12.02	14.33	11.05	9.10	12.18
Sales	11.80	17.76	14.02	16.69	13.73	18.07
Professional Services	5.67	10.87	7.62	11.99	4.29	11.62
Government Services	19.64	9.56	16.46	8.76	19.31	9.66
Social Services	10.56	9.15	9.76	8.22	6.44	8.51
Accommodation & Other	7.07	6.69	5.49	6.32	8.16	8.10
Education						
Primary Education	9.71	4.51	8.54	3.89	4.72	2.11
Secondary: Drop-out	26.55	15.65	26.83	15.92	29.61	15.12
Secondary: Degree*	11.41	14.78	11.28	14.69	15.45	13.20
Trades & Other degree	31.06	29.98	34.76	29.92	32.19	32.52
Post-Secondary: Dropout	9.39	8.74	7.62	8.82	9.44	9.75
University Degree	10.02	19.87	8.23	19.26	7.30	20.57
Graduate Degree	1.86	6.74	2.74	7.50	1.29	6.73
Sample Size	1457	113012	312	38424	233	29339

* Represents the control variable left out of the regression for comparison and interpretation of dummy variable coefficients.

Source: Statistics Canada Public Use Microdata File, 1996

rural to urban areas, whereas the native trend is to move from urban to rural areas

(CMHC 1996, pp. 26-27)[19].

Although native males are younger than their white counterparts, they have the

same number of years of experience, and have the same number of weeks and years of

employment as whites. At the national level, 27% of natives do not complete secondary

school, whereas only 16% of whites drop out of high school. For those who advance

beyond high school, the types of post-secondary education are quite different for natives

and whites. Trades and 'other education' is essentially equal between white males and

native males with 31% of natives and 30% of whites studying trades. The percentage of

whites attaining a university education (20%) is double that of natives (10%).

Natives and whites share a similar distribution across industries but natives fall far

behind their white counterparts in occupational attainment. Although a slim majority of

natives are employed in high-skilled or professional employment, they still lag greatly

behind their white counterparts. In general, whites are employed in manufacturing (23%)

and sales (17%), with native employment being concentrated in government services

(19%) and manufacturing (17%). Both groups have a heavy concentration in the

manufacturing sector, but the difference in occupational attainment could mean that

whites are employed in the higher-wage managerial and technical positions, while natives

are employed in the lower-wage staff and maintenance positions.

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[19]Part of this increased movement to rural areas is due to changes in the Indian Act from 1985 to 1993. The 1985 Indian Act broadened the definition of who is considered Indian. As a result, individuals of native heritage either by birth or marriage who had been excluded from the native registry were added. These individuals mainly resided in urban areas, causing the bulk of the increase in urban native population.

The patterns remain consistent when assessing the white-native differences at the provincial level. In general, the white-native differences are smaller in Ontario (23%), and larger in British Columbia (35%), than for Canada (29%). Some differences merit mention. For high skilled occupations, the difference in white and native attainment is lower in Ontario (9%) than in either British Columbia (18%) or Canada (11%). Natives are more heavily concentrated in trades (35%) than their white counterparts (30%) in Ontario. This 5% difference is contrasted with a 1% difference between natives and whites in attaining a trades degree in both British Columbia and Canada. Despite this, for those natives in Ontario who complete an undergraduate degree (8%), a higher percentage continue on to advanced degrees (3%) than at the national level (2%) or those that live in British Columbia (1%).

Natives and whites residing in British Columbia are both very strongly unilingual English (85% and 67% for natives and whites respectively). Natives are still more likely to be single (33% versus 25% for whites), but in general BC residents are more likely to be single than non-BC residents (see table 3.1). In British Columbia, at the higher levels of education, a larger percentage of whites attained trades certificates and university degrees (54%) than did natives (39%). On the occupational side, a majority of native males are employed in low skill jobs (52%) with an equal percentage being employed in manufacturing and government services (19% each). In contrast the majority of white males are employed in high-skill occupations (66%) with the largest concentration employed in sales occupations (18%).

3.2   National Results

At the national level, male natives face an earnings gap of 29% relative to their white counterparts (table 3.2). This suggests a large increase in the raw white-native earnings differential starting from 15% in 1986 (George & Kuhn) to 17% in 1991 (De Silva) to 29% in 1996. This implies, that over the past decade, natives have received relatively smaller earnings increments than their white counterparts. Part of this could stem from the concentration of natives into lower skill level occupations,[20] which have lower wages, and have faced slower wage growth than high skill occupations (Freeman & Needels, 1993 and Richardson, 1997). Without time series data, the true trends of native and white wages cannot be determined. However, the results of this study establish a basis for further study when longitudinal data are available.

Decomposing the earnings differential yields interesting results. Unadjusted for sample selection bias, the differences in characteristics between whites and natives account for 77% of the difference in earnings. Only 23% of the white-native earnings difference cannot be explained through differences in characteristics. This means that less than one quarter of the earnings difference is due to labour market discrimination.[21]

Compared with the results of the other studies, this unexplained portion is also lower. Referring to table 3.2, the George and Kuhn study (using 1985 data) found that

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[20] The stark white-native divide among the occupational groups may be the result of discrimination due to occupational segregation. This study is not broad enough in scope to determine the extent to which discrimination slots natives and whites into different occupational categories, but this merits further study in the future.

[21] It should be noted that the differences in characteristics (e.g. education) could be the result of pre-labour market discrimination.

Table 3.2

Unadjusted decomposition of the white-native earnings differential for Canada, Ontario and British Columbia

	1985[†] George & Kuhn	1990[‡] De Silva	1995*	
Canadian Results				
Raw Earnings Differential	0.140 (15%)	0.160 (17.4%)	0.255	(29.0%)
Using white weights				
Explained Portion	0.068 (22.%)+	0.091 (57.1%)	0.195	(76.6%)
Residual Portion	0.072 (51%)	0.069 (42.9%)	0.060	(23.4%)
Using native weights				
Explained Portion	0.085(39%)	0.087 (54.3%)	0.152	(59.6%)
Residual Portion	0.055(61%)	0.073 (45.7%)	0.103	(40.4%)
Ontario Results				
Raw Earnings Differential	N/A	N/A	0.210	(23.4%)
Using white weights				
Explained Portion	N/A	N/A	0.179	(85.4%)
Residual Portion			0.031	(14.6%)
Using native weights				
Explained Portion	N/A	N/A	0.163	(77.9%)
Residual Portion			0.047	(22.1%)
British Columbia Results				
Raw Earnings Differential	N/A	N/A	0.299	(34.9%)
Using white weights				
Explained Portion	N/A	N/A	0.124	(41.5%)
Residual Portion			0.175	(58.5%)
Using native weights				
Explained Portion	N/A	N/A	0.155	(43.5%)
Residual Portion			0.144	(56.5%)

SOURCE: Census Public Use Microdata set, 1996

Percentages given in parentheses

N/A represents not applicable as that area was not studied.

†1985 Figures are taken from George and Kuhn (1994) table 4, column 4.

‡1990 Figures are taken from De Silva (1999) table 7, column

*1995 Figures are calculated by the author.

+The figure printed in the George and Kuhn (1994) article is 22%. However it seems that the table contains a typographical error as the data published in the article suggests that the figure is 48.6%.

The calculation for the percentage of the earnings differential is [1-antilog (raw earnings differential)]*100. The percentages for the explained portion and unexplained portion are calculated as

[Explained portion / raw earnings differential]*100 (see equations 5 & 6 in section 3.2).

51%, over half, of the difference in earnings could not be explained by differences in characteristics. De Silva (using 1990 data) determined that 43% of the earnings differential could not be explained by the differences in characteristics between natives and whites. These findings would indicate that, despite an increasing earnings difference between whites and natives, the proportion of the earnings difference that could be the result of labour market discrimination is decreasing. One cannot say for sure if this is accurate, as there are five-year gaps in the data, differences in the variable definition, and differences in the specifications of the models used. To be more precise, one would need to undertake this study with longitudinal data, which is currently inadequate for this study. Nonetheless, the results of this study in comparison to the previous ones indicate a direction for further study.

The coefficients at the national level (see table 3.3) tell a very important story. Labour market experience for natives yields higher returns than for whites. Focusing on occupation, the native coefficients for the low, semi, and professional skill levels are all negative, which implies that native males employed full-time, full-year in Canada earn more by working in skilled labour employment than in any other category. For the professional category, the results were not significant, perhaps because so few natives are employed full-time, full-year in professional-level occupations. This may indicate that there is discrimination taking place in the labour market through occupational segregation. The results for the white group show that the professional skill level earns a large premium over that of skilled labour. In addition, the results show that there is a large earnings penalty (in relation to skilled labour) for being employed in a semi-skilled

or low-skilled occupation. As noted earlier, the concentration of natives into low-skilled

occupations may be the result of a secondary form of discrimination against natives.

Table 3.3

Native and white Regression Results - Canada

Variable	Native Coefficients[t]	White Coefficients[t]
Experience	0.0615*	0.0547*
Experience squared	-0.0847*	-0.0744*
Urban Dweller	0.0608**	0.10315*
Bilingual	0.17894*	-0.00513*
Unskilled Occupation	-0.08556*	-0.296*
Low-skilled Occupation	-0.15396*	-0.12888*
Professional Occupation	-0.0208	0.17148*
Primary Education	-0.24566*	-0.19882*
Secondary Education No Certificate	-0.0865*	-0.0975*
Trades and Vocational Certificates(s)	0.0616	0.12548*
Post Secondary No certificate	0.0759	0.0748*
University Degree(s)	0.29827*	0.28162*
R-squared	0.1118	0.1441
Sample Size	1489	113012

* Represents significance at the 5% level. ** represents significance at the 10% level.
†The coefficients for experience should be interpreted as the increase in earnings for each additional year, while the other coefficients for the other variables represent the change in earnings for each variable relative to its control variable. The control variables are listed in section 2.3 and are marked with an * in Table 3.1.
Source: 1996 Census Public Use Microdata Tape.

In relation to gaining a high school diploma, natives and whites have similar

returns to all levels of education except completing only primary school, and attaining a

trades or vocational certificate. In both cases whites fare much better. However, this

could be due to the fact that the older individuals in each group would be the ones with

the highest probability of not having attained education beyond primary school. This is

important for two reasons. The amount of education necessary to attain employment was

lower at the time the older individuals started working; earning a decent sum of money did not entail decades of formalized study. The second reason this is important is that, among the elder cohorts, whites had a higher probability of living in an urban centre than natives did. This would give whites better access to higher-paying manufacturing employment, and restrict natives to lower-earning rural employment. Furthermore, the extent of anti-discrimination legislation and enforcement was less when these individuals entered the labour force, so natives were more likely discriminated against in the labour market, reducing their earnings. Thus, among the older population of whites and natives, there may exist a larger divergence of earnings. In this case, the earnings premiums (or penalties) paid to completers of only elementary school will converge as the older workers age, retire, and are replaced with younger workers.

The returns to trades and vocational training are twice as high for whites as they are for natives. The native results are not significant, suggesting that there is no discernible difference between attaining a secondary-school diploma and a trade certificate for natives. One insight into these results comes from a study by Brown and Corcoran (1996) showing that there are gender-based differences in earnings depending on the gender differences in educational focus. Thus, the fields of training that natives study may be different than the fields of study that whites engage in, and the resulting employment opportunities differ correspondingly in terms of earnings. Unfortunately the information available does not allow us to evaluate this potential explanation.

Thus, overall there is no real difference between obtaining a vocational certificate or a secondary-school diploma for natives, while for whites the extra income earned when

moving from a secondary-school degree to a vocational certificate is double that of

natives. Combined with the fact that the extra earnings potential for attaining a university

degree over a high-school diploma is only slightly higher for natives than for whites , it

would seem a prudent choice for natives who wish to continue beyond high school to

enter into university education rather than college training.

3.3   Regional Analysis

Ontario

In Ontario the male native population employed full-time, full-year earns 23%

(table 3.2) less than their white counterparts. Ontario outperforms the Canadian average

with a lower white-native earning differential and a lower potential for discrimination.

Possible reasons for this could be: 1) Ontario has a larger secondary economy than

Canada as a whole; or, 2) Ontario has better enforcement of anti-discrimination

legislation; or, 3) many reserves are in relatively close proximity to manufacturing centres

in Southern Ontario; or 4) Ontario was having a better economic year than other parts of

Canada in 1995.

The coefficients for experience and education (table 3.3) are similar for both the

native and white groups. Natives earn less than whites for each additional year of

experience, while whites' increased earnings potential is decreasing at a greater rate than

that of the native group. In education natives face a much larger earnings penalty than

whites for completing less than high school, but a larger earnings premium for

completion of a university degree. As at the national level, the earnings increase for

moving from a secondary-school diploma to a vocational certificate is lower for natives than for whites, whereas increasing education from a secondary school diploma to a university degree yields a larger earnings premium for natives than it does for whites.

In contrast with the national results, the experience coefficients are lower in Ontario for both natives and whites. However, for natives, the coefficients for education are larger for Ontario than the coefficients for Canada, save for those who do not complete post-secondary education. The white coefficients for education are lower in Ontario than in Canada. Overall, for both Canada and Ontario, the returns to higher education are larger than the returns to experience. For both Canada and Ontario this could imply one of two things: 1) firms value education over experience; or 2) higher education allows one to move between career tracks, while experience allows one to move along career tracks.

The major result for Ontario is that native males employed full-year, full-time face an earnings penalty for residing in an urban area, where white males employed full-year, full-time earn a significant premium for living in urban areas. This could be tied to the occupational results, as the skilled natives living in rural areas of Ontario face less competition for employment from skilled whites. That is to say, with the majority of skilled white labour residing in cities, the rural natives face a less-skilled white labour force in the rural areas, and thus can earn more. If an urban area has a large pool of skilled labour, there may be stronger competition amongst individuals for skilled employment. Natives in such a scenario may accept a lower wage than whites in order to obtain employment. However, the same natives, if living in rural areas with a small

skilled labour pool, could earn higher wages due to less competition for employment.

For natives, the earnings increase for being employed in a professional occupation over a skilled occupation is larger than the premium for whites. However, the native result is not statistically significant, whereas the white result is. Of the 312 natives in the sample, only 38 (12%) are professionals, compared with 27% (10217 out of a sample of 38342) of whites.

In addition, the small sample for natives undermines the reliability of the coefficient for native professionals. One could infer that the small proportion of natives

Table 3.4
Regression Results for Ontario, 1996

Variable	Native	White
Experience	0.0502*	0.0541*
Experience squared/100	-0.05264*	-0.0352*
Urban Dweller	-0.0352	0.0919*
Bilingual	0.00580	0.0162**
Unskilled Occupations	-0.27668*	-0.2949*
Low-skilled Occupations	-0.17065*	-0.13101*
Professional Occupations	0.286	0.16584*
Primary Education	-0.45356*	-0.15266*
Secondary Education (no degree)	-.017387*	-0.0660*
Trades and Vocational Certificate	0.0846	0.1241*
Post Secondary (no degree)	0.0332	0.0734*
University Degree(s)	0.29979*	0.27817*
R squared	0.1850	0.1529
Sample Size	316	38342

NOTE: Figures denoted with *represent significance at the 5% level. ** represents significance at the 10% level.

employed in the professional occupations may be the result of occupational segregation. If the native coefficients are accurate, then a prudent choice for natives would be to enter the professional occupations instead of retaining employment in the skilled occupations.

For white males working full-time, full-year in Ontario, there is also a large and significant gain to be made from attaining a professional occupation over a skilled occupation. Thus, for whites the advisable choice would be to attain a professional occupation.

British Columbia

Native males employed full-year, full-time in British Columbia earn 34% less than their white counterparts, with the results of the decomposition showing that only 42% of the earnings differential can be attributed to differences between native and white characteristics (table 3.2). In contrast with Canada and Ontario, British Columbia has the highest native-white earnings differential, with the highest potential discrimination.[22]

For British Columbia, the regression results (table 3.5) show that the experience of natives and whites is similar to those of Canada and Ontario. Natives earn more than whites for each additional year of experience. The coefficient for the residency variable indicates that both natives and whites attain an earnings premium for residing in cities. The language variable suggests that natives receive a premium for being officially bilingual, while whites face an earning penalty, although neither of these results is significant due to the small number of observations for each. The small number of bilingual individuals among either group may be due to a small Francophone population, meaning that only federal offices need to maintain staff that is fluent in French.

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[22]Most of the results for British Columbia are not statistically significant because of the small sample size for both whites and natives.

Therefore, the fact that British Columbia has only two major urban centers (Victoria and Vancouver) with reserves in isolated locations, and that most natives employed full-year, full-time are in the public service, which requires some aptitude in French, the results seem intuitively correct. The only statistically significant occupational variable for the native group is unskilled labour. Note again that small sample sizes generate precision problems. As with the Canadian and Ontario results, unskilled labour faces a significant earnings penalty in comparison to skilled employment. For whites the results are similar,

Table 3.5
Regression Results for British Columbia, 1996

Variable	Native	White
Experience	0.0726*	0.0564*
Experience squared/100	-0.0994*	-0.0810*
Urban Dweller	0.0151	0.00609
Bilingual	0.0145	-0.0265
Unskilled Occupations	-0.29753*	-0.28056*
Low-skilled Occupations	-0.0169	-.010367*
Professional Occupations	-0.10398	0.1600*
Primary Education	-0.00973	-0.13213*
Secondary Education (no degree)	-0.23595*	-0.0976*
Trades and Vocational Certificate	-0.16692*	0.0723*
Post Secondary (no degree)	0.0405	0.0228
University Degree(s)	0.22529	0.17095*
R squared	0.1119	0.1141
Sample Size	221	11725

NOTE: Figures denoted with * represent significance at the 5% level. ** represents significance at the 10% level.

with large earnings penalties for semi-skilled and unskilled occupations and large earnings premiums for professional occupations.

The premium paid to native males employed full-time, full-year for a university

degree in British Columbia, although not significant, is just slightly lower than the figures for either Canada or Ontario. The earnings premium paid to white males employed full-time, full-year for a university education in British Columbia is smaller than for natives, but significant. In addition, at 0.17, the earnings premium paid to whites for a university degree is much lower in British Columbia than in Canada or Ontario, which both have a premium of 0.28. Addressing education for British Columbia generally, there seems to be no significant increase in white earnings, and a negative return for natives, for the attainment of trades and vocational training. This result could be due to differences in the earnings premiums between vocational certificates and on-the-job experience, which is a result of the differences in demand between labour market experience and formal education. For the individual, the decision to advance to the next level of education incurs the opportunity cost of lost labour market experience. If the returns to experience are higher than the returns to the certificates, then the individual will earn more by entering the labour force.

Overall, the results are more varied for British Columbia than for either Canada or Ontario. However, due to small sample sizes, the significance and reliability for many of the British Columbia results are in question. Hence, the results for British Columbia should be used with caution. Future studies will need to expand the sample in order to correct for this obstacle.

3.4   Sample Selection Correction

Recalling the earlier reservations about undertaking a sample selection correction, one should note that the native sample was too small to effectively run a sample selection

correction; thus, all the results are for the white sample. The results of the probit indicate

that the characteristics of the selected sample are significantly different from the

population as a whole (see Appendix B). The estimated coefficient for λ is negative and

significant, which implies that males in the sample are negatively selected into the sample

(employed full-time, full-year), meaning that there are unobserved reasons that result in

whites not entering the full-year, full-time labour market. However as noted earlier, with

no clear method for determining instruments for the probit, these results should be used

with caution.

Including the sample selection correction into the decomposition to undertake

Miller's differential in wage offers shows that, for Canada, 62% of the difference is

accountable to observable differences between natives and whites. For Ontario and

British

Table 3.6
Lambda values and Decomposition of Log Earnings using Sample Selection Corrected Coefficients.

Area of Study	Lambda	Explained Portion Actual	%	Unexplained Portion Actual	%
Canada	-0.42498 (-3.952)	0.158354	62.09	0.0967	37.91
Ontario	-0.51024 (-3.618)	0.137581	65.51	0.0724	34.49
British Columbia	-0.41443 (-3.644)	0.096394	32.24	0.2011	67.26

NOTE: t-ratios given in parentheses.

Columbia, the wage-offer decompositions show that differences in characteristics account

for 66% and 32%, respectively. In all cases the percentage of the difference in wage

offers attributable to differences in observable characteristics between natives and whites

is lower than the actual earnings differential for full-year, full-time workers. Hence, natives attaining full-time, full-year employment are offered less, ceteris paribus, than their white counterparts.

For both Canada and Ontario the difference in wage offers attributable to differences in characteristics between whites and natives is about two thirds. This means that, although there is some potential discrimination in the difference between white and native wage offers, the vast majority of the difference is due to differences in the characteristics of each group. The results for British Columbia, on the other hand, show that the majority of difference between wage offers is due to potential discrimination. At only 32%, the white-native wage offer differential attributable to differences in characteristics is half that of Canada and Ontario.

The results of this study stand in contrast with those of De Silva (1999), and agree with those of George & Kuhn (1994). De Silva's sample selection test shows that the sample group accurately represented the general population. Hence, the calculation for differences in wage offers was not conducted because λ was not significantly different from zero; the white-native wage offer differential was the same as the white-native earnings differential. Thus the white-native differential in wage offers at the Canadian level increased between 1991 and 1995; but, the portion of that due to potential discrimination fell from 43%[23] to 38% in the same period.

The George & Kuhn study shows similar results to this one. The most common similarity is the fact that the λ coefficients are negative. According to George & Kuhn,

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[23]The De Silva figure is taken from table 7, column 1.

this result means that unobserved characteristics lead whites to leave the full-time full-year workforce, which will lead to an underestimation of the white-native earnings differential (George & Kuhn 1994, p. 41). Granted that the white-native wage offers, as defined by Miller (1987), are larger than the observed white-native earnings differential, the results of this study concur with the findings of the George & Kuhn study. This means that there may exist several unobserved barriers to equality between natives and whites in the Canadian labour market. With the results for both Ontario, and especially for British Colombia (with the large change between the observed earnings gap, and the estimated wage gap), these unobserved barriers influence the labour market earnings of natives in the national and provincial labour markets.

Chapter 4

Conclusions & Policy Directions

The first section of this chapter provides the concluding remarks about the empirical results. The second section draws upon the results of this study to make recommendations about how to redress some of the earnings differential between white and native males in Canada.

4.1 Concluding Remarks

This study set out to determine the extent of the differential between white and native males who were employed full-year, full-time in 1995. The goal of this study is two-fold. First, it is meant to update previous studies by George & Kuhn (1994) and De Silva (1999), allowing for an assessment of the change over time in the earnings differential between native and white males employed full-time, full-year. The second goal is to examine regional differences in the extent of white-native earnings differentials through the assessment of Ontario and British Columbia. We might wish to look at regional differences because each province is unique, which means that the provincial results may vary to a large extent from the results of Canada as a whole. This is important, as the same policy may not be appropriate in all provinces. By assessing the situation in each region, the different levels of government can build more effective policies to address the white-native earnings differential, and better enforce affirmative action and anti-discrimination legislation.

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The results show the earnings differential, between white and native males employed full-time, full-year, at the national level to be 29%, which indicates a widening earnings gap compared to 1985 (15%) and 1990 (17%). Despite this, the decomposition results show that the potential for discrimination, over the ten-year period that this and the previous two studies cover, has been decreasing. Almost 60% of the difference in earnings in 1995 can be attributed to differences in group characteristics. This means that bringing native characteristics towards matching the white characteristics may alleviate a large portion of the white-native earnings differential.

The regional assessment provides some surprising results which show that there are large differences between provinces. Ontario, for the most part, has a lower white-native earnings differential and lower potential discrimination among males employed full-time, full-year than Canada. Unfortunately, small sample sizes mean that many of the variables in British Columbia are not significant. *If* the results for British Columbia are representative, then B.C. has a very large white-native earnings differential, much of which is unexplained and thus could potentially be due to discrimination.

This study is plagued with data limitations which create problems in the assessment of the results, particularly in the regional analysis. The reduction in the number of individuals in the censuses between 1991 and 1996 and the smaller sample sizes available for the regional level (especially for British Columbia) raise doubts over the precision of the results.

However, given that the lack of data has meant we know very little, any data and all studies are important. The comparison of the three studies gives some indication of

the changes that have taken place over time. The fact that all three studies (including this one) utilize cross-sectional data as no suitable longitudinal data sets exist means that detailed analysis of white-native earnings trends over time cannot be undertaken. Therefore, the results of this and the previous studies are not complete; further research in this area is recommended.

4.2 Policy Directives

As noted in the introduction, the average native income is hovering around the low income cut off, suggesting that natives have a higher incidence of poverty than whites. Furthermore, there has been very little study done on the integration of natives into the labour market. That is to say, poverty among individuals and between racial groups may be the result of labour market discrimination. Estimates here indicate that 23% of the differences in earnings between whites and natives cannot be explained, and is considered potential discrimination.

One possible reason for this large earnings differential between white and native males may be the geographic isolation of native reserves. Being so far removed from the economic centres of Canada, many natives lack the ability to enter the labour market. This isolation may also prove to be a barrier to any government initiative to reducing the earnings differential between whites and natives. This said, the government should still implement programs and policies to reduce the earnings differential between groups in Canadian society, and more important, to eradicate the hidden discrimination that takes place against minority groups. There are several policy directions that apply to natives,

and may prove useful in reducing the earnings differential for all minorities.

Based upon the results of this thesis, the most sensible policy to reduce the

earnings differential would be to promote native participation in university education.

Using white weights, differences in education account (table 4.1) for 25% of the

difference in earnings for British Columbia, 40% for Ontario, and 25% for Canada as a

whole. Ontario clearly has the most potential for using increased native education to

reduce the white-native earnings differential.

Table 4.1
Contribution of education to the explanation of the white-native earnings differential

Area of Study	White Weights	Native Weights
Canada		
Total contribution	0.0648	0.0604
%-of Explained Portion	33.21%	39.74%
%-of Total Differential	25.4%	23.7%
Ontario		
Total contribution	0.0837	0.0531
%-of Explained Portion	46.75%	32.57%
%-of Total Differential	39.85%	25.28%
British Columbia		
Total contribution	0.0762	0.0499
%-of Explained Portion	61.42%	32.19%
%-of Total Differential	25.47%	16.69%

Calculations made by author.

First, with the high returns to university education seen in table 3.3, increasing the

educational attainment of natives to be on par with their white counterparts would greatly

decrease the earnings gap between native and white males employed full-year, full-time

in the absence of labour market discrimination. Focusing on the coefficients in table 3.3,

one can see that changing from trades to undergraduate education will provide natives

with a high earnings premium; about half of the earnings differential could be erased by increasing the education of natives in comparison to whites. Increasing the level of native education may also reduce the earnings differential as higher educated natives can attain higher-skilled employment. Blackburn (1992) finds a strong correlation between education and occupational attainment between men and women. If the findings of the Blackburn study hold for interracial differences then the increased education of natives will also open them to higher paying occupations, if there were no discrimination present.

The second avenue to reduce the white-native earnings differential is through increased occupational attainment. That is, as the education of natives increases, theoretically so should the occupational attainment of natives. Hence, as natives receive higher levels of education, they will be better able to attain employment in higher-skilled occupations. These occupations earn a higher salary, and thus larger native representation would reduce the white-native earnings differential. Furthermore, increased occupational accessibility through increased education would provide a clearer understanding of whether firms occupationally segregate on the basis of race. By increasing the education of natives, the major reason for natives to be employed part-time part-year or in lower-skilled occupations will be reduced. Hence, if firms still channel natives in these lower-earning occupations after the education of natives rises, the discrimination against natives will be more obvious. In addition, with higher education, natives that do not enter the labour market may be able to use their enhanced education to aid the socio-economic development of their band or reserve.

Promoting greater education to reduce the native-white earnings differential may

fail for three reasons: funding, quality of education, or discrimination in education.

First, funding post secondary education may pose a problem for natives. With natives

currently earning less than whites, despite promotion of higher education, natives who are

poor cannot afford to attend. Combined with the rising costs of education, future

prospects for attending university will be slim for natives as their parents earn less than

whites, which reduces their income and their ability to finance post-secondary education,

which in turn places young natives back into lower-skilled lower-earnings occupations,

and the cycle continues. The federal government and the provinces do provide funding

for post-secondary studies. In 1995 the Department of Indian Affairs and Northern

Development (DIAND) oversaw $247 million[24] for the administration and funding of

native post secondary education (DIAND 1996). Most of the roughly 27000 natives

enrolled in post-secondary education received some form of financial assistance from

DIAND (DIAND 1997). Ideally, these funding programs will be increased to account for

the ever rising cost of education.

Second, just providing the funding to natives for higher education may not

guarantee that more natives will attain a university degree. Natives may receive funding

to attend university, however due to a poor quality of basic education, natives may not be

prepared for university. As a result natives may find that they are disadvantaged and drop

out.[25] If a sufficient number of natives become discouraged, they may influence others

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[24]This figure represents the total. Actual funding levels are lower as administration costs, including $20 million in 1995 to deal with the backlog of applications. In addition, DIAND does not provide statistics on the range or level of funding options available.

[25]This would make an interesting topic for future study.

either not to participate in acquiring higher education, or to study at a community college instead.

Finally, the promotion of more university education among natives may fail, despite having both the financial opportunity and education of sufficient quality, because natives may face discrimination in university acceptance. If natives are discriminated against in terms of admissions, they will either leave formal education completely or will enroll in non-university, post-secondary education. If natives face either a poor quality of education or discrimination, the ability of the government policies and programs to encourage university training for natives will be hindered. Thus, the government may need to take broader actions to promote university education among natives which may include better basic education and/or more stringent anti-discrimination/affirmative action legislation.

Appendix A

Oaxaca Decomposition Technique

Part A   Theoretical Starting Point

In a perfectly competitive market, discrimination can be said to exist where the relative wage of a group is lower than what would have prevailed if every individual were paid according to their marginal productivity. Thus individuals would receive the marginal product of their labour. Oaxaca (1973) defined this Mathematically as:

$$(1) \quad \frac{W^w}{W^n} = \frac{MP^w}{MP^n}$$

where W is the wage rate and MP^n and MP^w are the marginal products of natives and whites respectively.

Equation (1) merely states that

$$(2) \quad W^n = MP^n \quad \text{and} \quad W^w = MP^w$$

Accordingly, the relative white-native wage in the absence of discrimination (equation 1) can be rewritten as

$$(3) \quad W^w - W^n = MP^w - MP^n$$

Equation (3) states that the difference in wages between whites and natives will be equal to the difference in the marginal productivity of whites and natives. Thus, in the absence of discrimination the left and right hand sides of the equation will be substitutable.

Becker's Discrimination Coefficient (DC) represents the wage differential between the different groups. Thus, to measure the discrimination coefficient all one needs to do is to subtract the individual's relative marginal productivity from the observed wage ratio.

$$(4) \quad DC = (W^w - W^n)^0 - (MP^w - MP^n)$$

where $(W^w - W^n)^0$ represents the earnings difference observed in the labour market. In the absence of discrimination, $(W^w - W^n)^0 = (MP^w - MP^n)$ and the Discrimination Coefficient equals zero. If $(W^w - W^n)^0$ $(MP^w - MP^n)$ then DC will have a value other than zero.

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Becker represented DC in percentage terms. To transform (4) into a percentage, the difference between the observed white native wage ratio and the relative marginal product is divided by the relative marginal product. Mathematically this is represented by

$$(5) \quad DC = \frac{(W^w-W^n)^0 - (MP^w-MP^n)}{(MP^w-MP^n)}$$

Recalling equation (2) and substituting wages for marginal product, equation (5) can be rewritten as

$$(6) \quad DC = \frac{(W^w-W^n)^0 - (W^w-W^n)}{(W^w-W^n)}$$

where the Discrimination Coefficient is the proportion of the difference between the observed earnings difference and the difference in earnings based on differences in marginal productivity divided by the differences in earnings based on productivity. Simplifying the equation we get

$$DC = \frac{(W^w-W^n)^0}{(W^w-W^n)} - \frac{(W^w-W^n)}{(W^w-W^n)}$$

$$(7) \quad DC = \frac{(W^w-W^n)^0}{(W^w-W^n)} - 1$$

Part B Concrete Application

Since marginal products of individuals are unknown, making $MP^w - MP^n$ and $(W^w - W^n)$ unknown, we can estimate the mean productivity for each of the racial groups by estimating the earnings structure of each group. By making the assumption that the earnings structure for whites and natives is the same in the absence of discrimination , the differences in earnings structures represent the differences in the marginal product of each group. If these proxies are substituted into equation (5) to replace the marginal products, then we can estimate Becker's discrimination coefficient.

The problem arises in how to estimate these proxies. Here we turn to the human capital model, which estimates a wage structure based upon a variety of characteristics that an individual has. These range from education and on the job training to place of residence and marital status.

However, the human capital model uses price as the indicator of labour market value, which in turn acts as the shadow value of the individuals marginal productivity. The natural logarithm of the individuals labour market price (wages) is regressed on the endowments that influence that price.

(8) $Ln(W^w) = X^w \beta^w + u^w$

$Ln(W^n) = X^n \beta^n + u^n$

where
W is the individuals earnings. It is put in log form because this allows the β's to act as elasticity   measures of earnings for incremental changes in each characteristic.
X represents the individual characteristics
β represents the coefficients for each characteristic
u represents the error term.
w and n represent the white and native groups respectively

Equation (8) is used to estimate earnings functions for the white and native groups separately. By using the natural logarithm of wages, the coefficients (β's) represent the wage elasticity of endowment. That is to say the β's represent the change in earnings for a marginal change in the characteristic.

In the estimated human capital regressions in (6), $X\beta$ is the proxy for the individual's productivity. To use these proxies let

(9) $X^w \beta^w = MP^w$

$X^n \beta^n = MP^n$

and

$(LnW^w - LnW^n) = (W^w - W^n)o$

Which means that we have substituted the marginal product of whites and natives with their respective individual characteristics multiplied by their respective coefficients. Also, we have substituted the natural log of the observed wages in the labour market as our "observed" wage difference. Substituting (9) back into (4) yields

(10) $DC = (LnW^w - LnW^n) - (X^w \beta^w - X^n \beta^n)$

This provides us with a measure of discrimination in the labour market based on the proxies we have used in (9) to represent the individuals marginal product. There are three assumptions one can make about the earnings level in the absence of discrimination. If there were no discrimination present: 1) the wage rate of whites would also apply to natives; 2) the wage rate of native would also apply to whites; 3) the wage rate would lie somewhere between the white and native rates.
Assuming that in the absence of discrimination the white wage rate would apply to natives, the white coefficients are applied to both groups. Thus we substitute white

coefficients (but not endowments) for native coefficients. This yields

(11) $DC = (LnW^w - LnW^n) - (X^w\beta^w - X^n\beta^W)$

Which can be simplified to

(12) $DC = (LnW^w - LnW^n) - \beta^w(X^w - X^n)$

where
DC is the discrimination coefficient;
$(LnW^w - LnW^n)$ is the observed difference in earnings between whites and natives;
$\beta^w(X^w - X^n)$ is the log difference in earnings resulting from the difference in endowments between whites and natives.

Turning this into a percentage gives us (equation (4))

(13) $DC = \dfrac{(LnW^w - LnW^n)}{(LnW^w - LnW^n)} - \dfrac{\beta^w(X^w - X^n)}{(LnW^w - LnW^n)}$

This simplifies to

(14) $DC = 1 - \dfrac{\beta^w(X^w - X^n)}{(LnW^w - LnW^n)}$

For simplicity, let

$$\Theta = \dfrac{\beta^w(X^w - X^n)}{(LnW^w - LnW^n)}$$

And accordingly,

$$1 - \Theta = DC$$

where
Θ represents the estimated proportion of the earnings difference that can be explained by differences in endowments;
$1 - \Theta$ is the estimated Discrimination Coefficient (DC)

Source: Oaxaca, Ronald L. (1973) "Male-Female Wage Differentials in Urban Labour Markets. The author has made changes to the original model.

Appendix B

Results of the Probit used in the Heckman correction.

The following three sections provide the results for the probit estimation of working full-time, full-year for the Heckman two stage correction for sample selection bias. As noted on page 55, the native population was too small to perform an effective Heckman procedure on; thus, only the white sample was tested. The model for each group was constructed identically. The equation used is:

$$\text{prob(FTFY)} = f(\text{age, age squared/100, marital status, immigration status})$$

where FTFY is a dummy variable defined as 1 if the individual is engaged in the full-time, full-year labour market and zero if otherwise. Age and age-squared/100 are continuous variables representing the individual's age. Marital status is a dummy variable which equals 1 if the person is married (and not separated) or zero otherwise. Immigration status is a dummy variable that controls for immigration, with immigrants identified as 1 and non-immigrants identified as zero.

Whites in Canada as a Whole

MADDALA R^2 0.7727E-01

Variable	Estimated Coefficient	Asymptotic Standard Error	Asymptotic T-ratio
age	0.0068247*	0.0004086	16.703
age-squared/100	-0.19238*	0.0031565	-60.949
marital status	0.46951*	0.0097767	48.023
immigrant status	0.034493*	0.012892	2.6756
constant	-0.99961*	0.021787	-45.88
lambda	-0.42498*	0.107535	-3.952

Note: Figures Denoted by * represent significance at the 5% level.

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Whites in Ontario

MADDALA R^2 0.8136E-01

Variable	Estimated Coefficient	Asymptotic Standard Error	Asymptotic T-ratio
age	0.17744*	0.0040547	43.761
age squared / 100	-0.21141*	0.0047974	-44.067
marital status	0.38063*	0.015758	24.155
immigration status	-0.10987*	0.015962	-6.8831
constant	-3.1225*	0.078061	-40.001
lambda	-0.51024*	0.141028	-3.618

Note: Figures Denoted by * represent significance at the 5% level.

Whites in British Columbia

MADDALA R^2 0.8669E-01

Variable	Estimated Coefficient	Asymptotic Standard Error	Asymptotic T-Ratio
age	0.15214*	0.0056355	26.998
age^2/100	-0.18049*	0.0068678	-26.28
marital Status	0.43088*	0.021942	19.637
immigration Status	-0.024848	0.026646	-0.93251
constant	-2.9085*	0.10631	-27.36
lambda	-0.41443*	0.113729	-3.644

Note: Figures Denoted by * represent significance at the 5% level.

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