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THREE ESSAYS ON HUMAN CAPITAL AND THE FAMILY

by

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A thesis submitted to
the Faculty of Graduate Studies and Research
in partial fulfilment of
the requirements for the degree of
Doctor of Philosophy

Department of Economics

Carleton University

Ottawa, Ontario

December 1988

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We undersigned hereby recommend to
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ABSTRACT

This thesis presents three studies of the impact of family background on the level of investment in human capital, typically education, and earnings. In particular, the purpose of the analysis in these studies is to explain variations in the level of human capital investments and the returns these investments earn across sub-groups of Canadian males.

The first essay examines the role that parents play in transmitting earnings advantages and disadvantages to their children. This is done in the context of a comparison of the earnings of the sons of native-born and of foreign-born Canadians. Evidence is found that greater ability or motivation may be so transferred from a foreign-born father, and that a foreign-born mother may pass on some of the handicap of her country-specific human capital. Perhaps equally important in perpetuating the earnings advantages found for immigrants is a significant tendency for these children to be better endowed with investments in education.

The second essay is concerned with variations in the returns to human capital observed across religious groups. Here current marital status is considered, as an alternative to the family background orientation of the literature. Evidence is presented that marriage significantly affects male returns to experience and that this effect varies predictably across religions. Moreover, the effect of marital status is found to explain virtually all variations in the returns to experience between religious groups in previous Canadian work.

The final essay considers the impact that parental quality/quantity fertility decisions might have on observed investments in education and the

returns these earn. This is examined in the context of comparisons of Canadian ethnic groups. Much of the variation in parental fertility and own education of these groups is found to be explainable with a standard group of variables describing the costs and opportunities they face. Differences with more recent entrant groups are found to be amenable to an explanation involving the information available within their ethnic community, differences that appear to be on the decline as the peculiar nature of these communities declines.

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CHAPTER ONE

INTRODUCTION

This thesis is composed of three essays. Each is contained separately in the three chapters that follow, but all concern a fairly narrow subject area in the broader field of labour economics. There are two unifying themes. Each essay examines differences in human capital investments and their role in the determination of earnings across subgroups of the population - divisions on the basis of parental nativity, religion and ethnic background respectively. Each then focusses on a particular mechanism through which family might influence human capital investments or the returns they earn, contributing to the earnings differentials observed.

The first essay is titled "Intergenerational Transfers and Human Capital: Earnings of the Sons of Canadian Immigrants". Its primary focus is on the possible transfer of human capital based earnings differences from the immigrant population to their native-born sons. These could be of two types: ability or motivational advantages, as demonstrated by their parents, or handicaps due to the obsolete country-of-origin-specific human capital of the immigrant generation.

Empirically, this chapter begins by following American and Australian studies in evaluating these possibilities by comparing earnings functions for the sons of native-born Canadians and those with at least one foreign-born parent. This testing is then extended beyond previous work by considering more explicitly how earnings and returns to human capital vary depending upon the sex of the foreign-born parent(s). Those with at least one foreign-born parent are divided into three groups: those with both

parents foreign born, those with only a father foreign born and those whose mother only was foreign born. Rates of return to the various forms of human capital captured in the earnings function are then compared again.

At this level of disaggregation, direct evidence is found of significant differences in these rates of return. This is something previous work, with its focus on the aggregated data, had not discovered. These results support the hypothesis that ability or motivation can be transferred from generation to generation. Specifically, the proposition that immigrant fathers rather than mothers are the more likely source of such a transfer is confirmed. Support is also found, though sensitive to country of origin, for the hypothesis that parental stocks of human capital specific to non-Canadian circumstances may disadvantage their children's accumulation or use of educational human capital. As expected, this is found to be the case where the mother is foreign born and the father not.

Previous work in this area had found lower earnings advantages for the sons of foreign-born fathers when the mother was also foreign born. As other authors note, this pattern, while perhaps due to the latter of the two effects noted above, is susceptible to alternative explanations. One such is the possibility that foreign-born fathers have been sorted by marriage - the more able marrying native-born women, while the less successful marry the foreign-born. Evidence produced here on the returns to experience does not contradict the implication that intergenerational transfers will then produce greater ability for those whose father only was foreign born and less where both parents were immigrants. Extending this evidence to the question of their father's abilities, however, does not seem possible beyond noting some educational and occupational status

differences that are reasonably supportive.

Perhaps the most significant finding of this essay, however, is that Canadian data do not provide the usual indications of a rapid regression to the mean in the earnings of this second generation. Evidence is found that ability differentials and handicaps have been transmitted, and it is observed that significant differences exist in the educational achievements and work habits of the sons of immigrants. From this data set it seems that in Canada there is more persistence in these advantages.

The title of the second essay is "Religion, Marital Status, and the Returns to Human Capital". This chapter analyzes the influence of marital status on male earnings and the returns to human capital in the context of religious affiliation.

Several hypotheses regarding the impact of marriage on earnings are evaluated empirically. It has been suggested that marriage will be associated with additional specialized investments in human capital. For the typical married male, this will imply more rapid accumulation of experience-related human capital on the job, which should be observed in the form of a higher apparent rate of return to years of experience while married. A further possibility is that specialization in the job market will free males from the effort-intensive household sector, enabling them to make fuller use of educational human capital and human capital acquired prior to marriage.

Strong support is found for the first of these hypotheses. The major effect of marriage on male earnings is to steepen the age-earnings profile beginning at the time of marriage. Only limited support in the form of an interaction between years of education and marriage is found for the

second.

This empirical framework is then used to evaluate the impact that religion has on marriage and earnings. Religion is hypothesized to affect the actions of married individuals by imposing specific constraints or expectations on them, by altering the expected duration of marriage or its terms of dissolution, and by influencing the efficiency of mate selection. As religions differ in the extent to which these influences are wielded, the expectation is that the effects of marital status will differ accordingly.

The expected variation by religion is generally confirmed. Roman Catholics in particular are found to be significantly affected by marriage, as might be expected given the stronger than usual positions taken by that Church on divorce and birth-control. Jews, whose institutions and divorce statistics also indicate particularly stable marriages, show some signs of the expected effects on earnings in point estimates, although significance for these is lacking, possibly due to small sample size. The other religious group which demonstrates significant advantages from marriage is, surprisingly, that with No Religion. In this case, however, a selection process may be occurring; those who remain married without an assist from religion appear to be those who are successful in specializing.

The evidence from interacting marital status and religion in determining earnings confirms other work indicating that institutional factors like religion affect behaviour within marriage. It also has much to say about evidence that religious background affects returns to human capital, notably years of experience. The most significant result is that the differential effect of marital status explains virtually all variations

in returns to experience across Canadian religious groups noted in previous work. To this point in time, the only consistent explanation for religious variations in returns to human capital has been family background.

These results have also been considered as they relate to a variety of inconsistencies and evolving patterns noted in previous work on earnings by religion. Tomes (1983) and Meng and Sentence (1984) disagree for example on the effect of a university degree on Roman Catholic earnings and on whether the returns to experience for that group were relatively low. The present study suggests such inconsistencies may be the result of different weightings of single individuals in the samples used.

The decline of differences in the returns to human capital from 1971 to 1981, and the smaller degree of variation in Quebec in 1971 noted by Tomes (1983, 1985) can also be explained in this framework in terms of the impact of the rules of marriage on intra-marital specialization and individual earnings. Divorce Act changes in 1968 had by 1981 significantly reduced the expected duration of and division of labour within marriage. Stringent legal restrictions on divorce and property settlements applied to all in Quebec prior to 1968, lessening variation by religion in expectations and behaviour.

Finally, these results provide the beginnings for a reconciliation of U.S. and Canadian evidence on Catholic/Protestant earnings differences. Marital status effects for the first time give some indication from Canadian data that there are forces tending to raise Catholic earnings relative to Protestant, as is generally observed in American data.

The third essay is titled "Ethnicity, Education, and the Returns to Human Capital: the Role of Family Background". Its focus is the

relationship between ethnic investments in education and the rates of return they earn. Following Chiswick (1986) this chapter refers to the economics of fertility to suggest that parental quality/quantity choices may be the key, first to the years of education the individual receives, and secondly to the productivity of such investments. Those who invest in education for their child are hypothesized to invest in complementary inputs that will enhance this productivity. This explains the common observation of a positive relation between these two variables across subgroups of the population.

Examination of the extent to which this mechanism can explain observed behavior is pursued by specifying parental fertility decisions and the individual's own education as functions of the costs and opportunities facing the relevant decision-makers. An earnings function completes the picture with estimates of the importance of education in determining earnings and of differences in rates of return.

Estimated using pooled data from nine ethnic groups, the model is quite successful at reducing the range of unexplained group differences in earnings, education and parental fertility. Over half of such differences are accounted for. This outcome provides strong support for the hypothesis that much of the observed variation in educational investments across ethnic groups comes from the quantity/quality dimension of parental fertility decisions. These results also largely fulfill Chiswick's hope that such differences can be explained as the outcome of group differences in costs and opportunities, as opposed to more ad hoc factors such as 'tastes' or 'discrimination'.

While the overall differences between groups and the behaviour of

several specific ethnic groups, notably the French, are well handled by the model in the pooled estimates, this is not true for all ethnic groups. Jews in particular retain significant differences in the pooled data for all three equations, while at least one such difference remains for Poles, Ukrainians and Scots. This inconsistency is further examined by estimation of the fertility and education equations for six sub-samples composed of one or several ethnic groups.

Sufficient variation in the sample by sample estimates of the model exists to justify this degree of separation. Nevertheless, the degree to which the determination of parental fertility and own education are consistent across these samples is still remarkable. The important determining variables tend to be the same and few sign changes are observed.

Moreover, much of the variation that does exist appears to be sufficiently systematic to contribute rather than detract from the ability of the model to explain these differences in terms of costs and opportunities. The majority of these deviations are between those ethnic groups which are referred to in the sociological literature on Canadian ethnicity as 'charter' groups - particularly the english speaking ones, the English, Scottish and Irish - and the non-charter or 'ethnic' groups - in this study the Poles, Norwegians, Ukrainians and Germans. These latter groups are found to vary from the pattern set by the former largely because of an apparent split in the 'ethnic' groups between those with characteristics indicating ties to what the Mosaic theory of the sociologists refers to as ethnic communities, and those who have been further integrated into Canadian society.

This is readily interpreted in economic terms as a difference in the information set available to the prospective parents. As the members of these ethnic groups leave the community, or as new technology and communications advances invade, this information set broadens and behaviour becomes more predictable or uniform. Outcomes can still be expected to vary, but the process, as hypothesized, is relatively consistent across groups.

CHAPTER TWO

Intergenerational Transfers and Human Capital: Earnings of the Sons of Canadian Immigrants

INTRODUCTION

Immigration policy is currently an issue of some importance to Canadians. We debate what to do about refugees, and ponder the use of immigration to solve our population growth problems¹. The economic contribution to this discussion, though more limited in scope, is central to both issues. We need to appreciate the incentives and motivation of the individual, and to evaluate their interaction with the economy in order to design policies to achieve these desired ends.

The earnings of immigrants themselves have been closely examined and their abilities and achievements found to be remarkable, despite initial handicaps due to language, unfamiliar institutions and so on. A consistent picture of this process has been built up from evidence for the United States, Australia, Britain, and more recently Canada.² A complete understanding of the impact of immigration, however, requires evidence on whether the ability and motivation shown and the handicaps suffered by immigrants are confined entirely to the first generation. Despite the importance of the question, we can make surprisingly few definitive statements about these later generations. Research in this area for Canada (Marr (1981)) has only partially reproduced the work done in the United States and Australia.³ In no case has research proceeded from the identification of competing hypotheses to adequate testing of them.

This chapter, then, has two objectives. The first is simply to bring estimation of the earnings of second generation Canadians up to the level of previous research for the United States and Australia.⁴ The second, and more ambitious, is to construct tests of the hypotheses that have been advanced to explain these results. Instrumental in this is the use of a data set (the Canadian National Mobility Study) that offers considerably more information on the characteristics and achievements of one's parents than is typical in this literature.

Beyond the present policy context, it is hoped that this will also contribute to the more general study of intergenerational transfers of human capital and other factors involved in the determination of earnings.⁵ These individuals and their parents have provided here one of the rare instances where data on successive generations might make this possible.

The following section outlines the hypotheses that have been suggested in the literature and the testing and empirical evidence that have accumulated. Subsequent sections develop the approach taken in the present chapter and discuss empirical results generated.

HYPOTHESES

The literature on the earnings of sons of immigrants has examined hypotheses falling into three categories. These concern (1) the earnings of this generation as contrasted to the sons of the native born, (2) the inheritance of those advantages and disadvantages generally attributed to the immigrant generation, and (3) the more specific roles of male and female parents in this process.

The status of these individuals as the sons of at least one foreign-born parent is central to the analysis. Theory suggests that migration is a selective process⁶. This suggestion is generally supported by evidence of greater than average "innate ability and motivation", enabling an otherwise average individual to be more productive and generate above average returns to given amounts of human capital. This evidence consists primarily of significantly higher rates of return to post-migrant experience. Confirmation of this effect for the United States has been provided by Chiswick (1978), for Australia by Chiswick and Miller (1984) and for Canada by Tandon (1977) and Meng (1987).⁷

At the same time, a portion of the human capital possessed by immigrants on entry to their country of destination appears to be 'country-specific' and therefore of reduced value in the labour markets in which they then find themselves participating. The same studies that show higher returns to post-migrant experience also support this second proposition, with estimates of lower than usual returns to education and pre-migrant experience.

Investigation of the sons of these immigrants begins with the proposition that they may inherit some part of the earnings differentials of their parents. Chiswick (1977), Chiswick and Miller (1984), Marr (1981) and Carliner (1980) have all pursued this possibility. Unadjusted earnings figures show a 12 percent advantage for this group in the United States and 4 percent in Australia.⁸ This is considerably reduced by adjusting for experience, education, weeks worked and so on. Chiswick found a 5 percent adjusted advantage in the U.S., Chiswick and Miller no significant advantage for Australia. Marr finds no adjusted differential in comparable

estimates for Canada, although the interpretation of this finding is unclear as he does not report unadjusted figures.

Further examination of these differentials pursues the question of how they are determined. Comparisons are also made to the determination of earnings among the sons of the native born, of particular interest being any indication of ability differentials or country-specific handicaps. Ability and motivation may be inheritable or encouraged by more able parents, implying in the present case a tendency to higher earnings based in part on higher returns to experience (as were exhibited by the immigrant parent). On the other hand, foreign-born parents raise the possibility of a home life where a foreign language, customs and institutions are dominant, putting the child at a disadvantage in acquiring human capital applicable to their country of residence⁹. Dealing with the sons of the foreign born as a group, the literature does not find evidence of such variations in the returns to human capital in the determination of earnings. Chiswick (1977) finds no significant difference from the sons of the native born in regression coefficients with the exception of a regional variable. A similar pattern is reported by Chiswick and Miller (1984).¹⁰

A possible explanation for this is implicit in the elaboration of the roles played by foreign parents of either sex. Chiswick has suggested that women are less likely to migrate for economic reasons than are men, or that an ability or motivation differential is more likely in foreign-born men than women¹¹. This has obvious implications for the possibility of inheriting parental ability. Male immigrant parents are more likely to provide this source of higher earnings for their children. The impact of language, culture, and other aspects of a foreign heritage may also depend

on the sex of the foreign-born parent. Typically, it has been the mother who is in the home in the child's formative years, implying that any disadvantage of this type is more likely where the mother is foreign-born than where the father is.¹² Depending on the sex of one's immigrant parent then, we expect a different set of advantages and disadvantages to influence the individual. These differentials are appropriately examined within subsets of the sons of immigrant parent(s) defined by sex, and may be obscured by considering the sons of the foreign born as a group.

Chiswick (1977) and Chiswick and Miller (1984) provide some empirical support for these propositions. They introduce to a sample of sons of native and foreign-born parents three dummy variables allowing consideration of those (1) with both parents foreign-born, (2) those with a foreign-born father (native-born mother), and (3) those with a foreign-born mother (native-born father). The U.S. data indicate that having only one's father foreign-born generates a considerable earnings advantage (7.7 percent adjusted). This is reduced somewhat by a foreign-born mother (5.6 percent adjusted earnings advantage if both parents are foreign-born) and is reduced even more in the case of only the mother being foreign born (3.7 percent adjusted). The earnings advantage declines as the parental mix changes to include more of a background handicap and less chance of an ability differential. Australian figures (2.9 percent advantage, 2.6 percent disadvantage and insignificant 1.7 percent advantage respectively) also demonstrate considerable variability depending upon the sex of the foreign-born parent and have been interpreted as added support for the hypotheses suggested above. Comparable Canadian estimates provided by Marr (1981) again indicate no significant differentials.

As Chiswick and Miller point out this evidence is vague enough to support alternative explanations, such as the possibility that the effects of different mother's origins merely reflect a sorting of male immigrants, with the more successful marrying native-born women and the less successful marrying foreign-born women. No attempt has been made to deal with this possibility empirically, probably due to the limitations of data, though two logical directions for further work present themselves: testing of the fathers involved to establish whether the suggested 'ability' differences are confirmed, and consideration of ways in which this sorting might proceed.

Also untested other than through the inferences from parental group dummies described above are differences in the determination of the sons' earnings depending upon the immigrant parent(s) sex. We would expect given the interpretations standard in the literature, that if inherited ability or motivation depended on the sex of immigrant parents, this would be reflected in the returns to experience and experience-related variables. Similarly, the role of parental sex in the transmission of country-specific handicaps should be related to the returns to education.

In this chapter, these hypotheses are tested using Canadian data. A particular interest is in disaggregating these data to test the possibility that the ability differentials and background handicaps discussed above are reflected in the determination of earnings where these vary by the sex of the foreign-born parent. Evidence on this basis should remove some of the ambiguity of the existing literature. The alternative 'sorting' hypothesis is also a subject of considerable interest and is assessed along the lines suggested to the extent that the data allow.

DATA AND SPECIFICATION

The data set used is the Canadian National Mobility Study (1973)¹³. This study was conducted in conjunction with the July 1973 Canadian Labour Force Survey and contains data on nearly 45,000 non-institutionalized respondents aged eighteen and over for the year 1972. These data are superior to the usual (and more recent) Census data for a number of reasons. In presenting actual years of education, actual years of experience (years worked for pay or profit) and a broader range of personal characteristics it provides more precise measurement of important human capital variables. This is somewhat offset by the need to take values for earned income and weeks worked from information on the interval the respective variable fell into for that individual. Also significant is the range of family background data presented, in particular on parental education, occupations and work history. It is the presence of these variables that enables this paper to provide new results relating to the untested portion of this literature.

The selection criteria for the sample used are comparable to those used by others: male, Canadian born, ages 22 to 64 inclusive, with positive weeks worked and positive earnings in 1972.¹⁴ The sample includes 1603 sons of foreign-born and 4452 sons of Canadian-born parents.

The basic estimating equation is an elaboration of the standard human capital earnings function used by Chiswick and others. The additions are those made possible by the wider range of variables contained in the data set, for example controls for other dimensions of family background. Other modifications are taken from recent Canadian research in this area (see

Tomes (1983)). Overall the model is similar to that used in Meng and Sentence (1984).

The general form of the earnings equation is:

$$\begin{aligned} \text{LNFARN}_i = & a_0 + a_1 X_i + a_2 \text{PR}_i + a_3 \text{UR}_i + a_4 L_i + a_5 R_i + a_6 \text{PX}_i \\ & + a_7 \text{FP}_i + a_8 \text{MB}_i + a_9 \text{FB}_i + e_i \end{aligned}$$

In this equation, the natural log of earned income is explained by a set of experience, education and work history variables (X_i), province or region (PR_i), urban or rural (UR_i), language (L_i), religion (R_i), parental human capital and work history (PX_i), foreign parent (FP_i), mother's birthplace (MB_i) and father's birthplace (FB_i) variables. These variables are listed fully and defined in Table II-1.

Overall, the results generated are consistent with other work in this area (or with this data (Meng and Sentence (1984), Meng (1987))). The majority of variables have expected signs and magnitudes and are highly significant (with more exceptions to this rule, again as expected, with parents of foreign birth).¹⁵ The family background variables are less frequently significant but as a group add significantly to the explanatory power of the regressions.¹⁶

RESULTS

Our stated interest is in the measurement of three effects: links between parental immigrant status and the earnings level of their children; the effect of parental advantages and disadvantages linked to immigrant status on the determination of their children's earnings, in particular rates of return to human capital; and the degree to which these effects

depend upon the sex of the immigrant parent(s). This evaluation utilizes four pieces of empirical information generated by the model: mean earnings and adjusted mean earnings among groups defined by parental nativity, and differences in the mean levels of explanatory variables (in particular human capital investments) and the coefficients on these, between which the variations noted in mean earnings are explained.

It is clear from these data that differences in earnings levels do exist. The average earnings of those Canadians with at least one foreign-born parent (PARFOR) are 17.6 percent higher than those with native-born parents, a differential well in excess of those reported elsewhere.¹⁷ This advantage, however, is almost entirely accounted for by differences in the characteristics identified in these regressions. Holding these constant, the adjusted earnings differential indicated by the PARFOR variable (Table II- 3, Column 2) is insignificant.¹⁸ Most important in this adjustment is the education attained by sons of the foreign-born. The extra time in school (nearly a year) accounts for 3.5 percent, while added degrees (12.6 percent have them, as opposed to 9.3 percent of those with Canadian-born parents) account for over 7.5 percent.¹⁹ Greater experience (2 percent), more weeks worked (2.6 percent) and location (1.5 percent for better regional distribution, 2 percent for being less rural) are the other major components of the unadjusted differential. The only significant negative characteristic is the greater tendency to self-employment on the part of sons of immigrants, reducing their earnings by about 1 percent.²⁰

That no adjusted differential remains here is unexceptional, similar in fact to results from Australian data. What is exceptional is the degree to which the characteristics of the sons of the foreign born in Canada must

differ to generate this result. Characteristics account for only a four percent gap in Australian earnings, seven percent in the United States. Canadian data indicate they account for almost eighteen percent. The differences in achieved education and weeks worked in particular present a challenge to the conclusions of the literature, based on American and Australian results, that there is a rapid regression to the mean after the immigrant generation.

We turn then to the hypothesis that the advantages and/or disadvantages that affected their parents earnings were inherited by these second generation Canadians. While the overall impact as noted above appears to be negligible, this constrains individual coefficient values on all explanatory variables to be the same for the two groups - a constraint which a Chow test indicates is inappropriate.²¹ Of particular interest are differences between the sons of native-born Canadians and those with at least one parent foreign born in the effects of the human capital variables on the determination of earnings. Estimates of these coefficient differences are presented as the added interaction terms (Table II-3, Column 3). Not altogether unexpectedly, these interaction terms in the Canadian case yield differences that are uniformly small and insignificant.²²

The third effect we are concerned with relates to the expectation that not all foreign-born parents have the same advantages and/or disadvantages to pass on to their children. This is primarily true, as detailed above, with regard to the sex of the parent concerned, although differences in country of origin are perhaps also important. Estimates of the effects concerned appear in Tables II-4 and II-5. Here we reproduce the results

noted above having broken down the sons of the foreign born into three groups: those with both parents of foreign birth, those with a foreign-born father (mother Canadian born), and those with a foreign-born mother (father Canadian born). Controlling for other characteristics (Table II-4, Column 2), the overall impact on earnings of membership in any of these groups (relative to being born of Canadian parents) is still insignificant as indicated by the coefficients on MOFOR, FAFOR and BPFOR.²³ This presents a further contrast to American and Australian results, though it supports Marr's Canadian results. Considerably more interesting is the evaluation of differences in the determination of earnings between the groups implied by this dummy analysis: those with Canadian-born parents and those from the three categories of foreign-born parents. Individual regressions on this basis appear in Table II-5, with estimates of differences in coefficients (with the Canadian-parented group as reference) for the major variables reported in Table II-4 (Columns 3a,b,c).

Here we find some evidence to accept the hypothesized effects of foreign-born parents in the Canadian case. The strongest finding is that where the father is foreign born, mother not, there is as is predicted some evidence of differential ability. This is shown (Table II-4, Column 3b) in the form of a significantly higher rate of return on experience-related variables, notably experience itself, and on the BREAK variable. Also supportive is the lack of such differences where the mother is the foreign-born parent. The point estimates on experience variables here (Column 3a) are not noticeably different from those of the sons of the native born and are certainly not significant.²⁴ The point estimate for the mother-only-foreign group for the return to education (Table II-5) is rather low, as

anticipated (and again in contrast to that for father-only-foreign). It is not significantly so, (Table II-4, Column 3a) but this appears to result from aggregating mothers with a wide variety of origins.²⁵ Dividing the foreign mother sample into four on the basis of origin generates at least two cases where these lower returns are significant.²⁶

Not all the evidence supports this viewpoint on the effects of foreign parents, however.²⁷ If, as is hypothesized, male immigrants have more motivation or ability to pass on, we would expect those whose immigrant fathers married immigrant women (the BPFOR group, Column 3c) to also have a higher rate of return on experience related variables. With one exception (the periods of unemployment variable), this is not the case. Nor does this group conform to the hypothesis that the disadvantage of other-country-specific knowledge and traditions may more likely or more dramatically be transmitted by the foreign-born mother. When the father is also foreign born the point estimate (Table II-5, Column 5) for education is about normal, contrary to our expectations.²⁸

THE SORTING HYPOTHESIS

As with previous testing, the results thus far are also consistent with the alternative hypothesis suggested by Chiswick and Miller (1984). This alternative, as outlined above, suggests ability differences among sons based on the sorting of more and less able foreign-born fathers among native and foreign-born wives respectively. Indications of greater ability are indeed found here for the sons of those foreign-born fathers who married Canadian-born wives. The absence of any clear ability differential

where both parents are foreign born also confirms the predictions of the sorting hypothesis. Acceptance of this possibility, (and rejection of the other) however, should be prefaced by further evidence on a couple of points. First, we seek confirmation that immigrant males marrying immigrant females were less able in some sense than those marrying Canadian-born females and second, we want identification of how this sorting process works.

On the first point, circumstantial evidence is by and large supportive, although a few awkward facts warrant more conclusive testing. Supporting the sorting explanation is background data (Table II-2b) on the two sets of immigrant fathers. Those who married native Canadians register a considerably higher Blishen Index of occupational status (36.0 vs. 31.8) and have also received more education (7.93 years vs. 6.75 years), indicating that the more successful, probably wealthier foreign-born fathers are married to native-born women. The problem is in linking this "success" to greater "ability". Our definition of ability is a relative one, involving not outcomes per se, but what is done with a given endowment of training and human capital. The observation of 'greater ability' in the sons of these better endowed and more successful fathers is perhaps an indication of greater 'ability' in the fathers as well (and less in those with less success). We find, however, that when we consider the native-born fathers who married immigrant women, similar and even greater educational and occupational success is not matched by observed 'ability' differentials in the sons. Either these are not necessarily indicators of ability differences or we need to explain why foreign-born men transmit ability to their sons when native-born men cannot.

Unfortunately, the data are not available to conclusively test for the predicted ability differential between male immigrants on the basis of their wife's nativity. The present data set can indicate the birthplace of one's mother and father, but does not give sufficient data on parental income and other factors to test for their ability. Data on immigrants generally do give earnings information, but not spousal birthplaces.

Considering the second point raised above (what happens in the sorting process), the concern with dividing the fathers up was kept in mind with some interesting results. One possibility is that marriage to foreign or Canadian-born women is a function of whether migration took place prior to or after marriage. The probability of marrying a Canadian-born woman should be higher if you live in Canada when you marry.²⁹ Attempts to replicate the two sets of fathers we are concerned with by defining groups in this way, however, reveal little support for sorting on this basis. The expected differences in education and occupational status are not matched, nor does there appear to be any difference between these groups in the 'ability' observed.³⁰

A second possibility lies in differences in the tendency of immigrants of different nationalities to marry native or foreign-born wives. The immigrant fathers in our sample who were largely from English-speaking countries were more likely to marry native Canadians (about 42% did) than were those from Western Europe (37%), or Eastern Europe (27%).³¹ The 'ability' differences and achievements of male immigrants from such areas are described in Meng (1987). There he finds that European (non-U.K.) immigrants do tend to have less education, fewer degrees and earn less than those from elsewhere (primarily the U.K. and the U.S.). This explains some

of the differences in observed achievements for the fathers we consider - the father only foreign group for example is on average more successful because the more successful U.K. group is more heavily weighted there.³² The estimated returns from these groups to human capital, however, run counter to such an interpretation. Although more "successful" by our measures, english-speaking immigrants seem to have less of an observed 'ability' differential as measured by returns to human capital variables.³³ On this basis, then, it does not seem possible to attribute higher degrees of ability to the father only foreign group. If country of origin is important in this regard, it is through some considerably more subtle effect of marital interaction than is considered here.

A final possibility is that we are observing groups whose immigrant parents came to Canada at different points in time. At an earlier date, average levels of education would be lower, and the type of work available in Canada would have been different. We begin by noting that the group with both parents foreign born is is (using an $\text{Age} = \text{EDUC} + \text{EXP} + 5$ approximation) some 5 years older on average. Further data of interest are found in considering the period in which the father moved to Canada. Fully 93 percent of the group with both parents foreign-born had fathers who moved to Canada before the Depression, compared to only 79 percent for those with a foreign-born father (mother native). Since educational achievement has generally increased over time, this could explain part of the observed difference in parental characteristics.³⁴ The available evidence, however, indicates no effect on earnings of the period of father's immigration.³⁵

Overall, it seems possible to 'explain' a fair portion of the observed

differences in fathers' achievements on the basis of country of origin or period of immigration. There seems, however, to be no further evidence of the 'ability' differences between the groups of fathers considered that the sorting hypothesis leads us to expect. In fact some indications of the opposite are found, as in the evidence by country of origin. This approach is in the awkward position then of suggesting parental sorting on the basis of ability where no such parental ability differential can be identified.

SUMMARY AND CONCLUSIONS

The results of this paper do not provide simple answers to the questions raised in this literature. Instead they indicate that the effects involved are more complicated, and can be understood only through more detailed analysis than they have received in the past.

Canadian data support and extend the observation that foreign parentage is an important influence on earnings. In addition to direct evidence of an effect on returns to human capital, a significant aggregate difference is found in identifiable endowments or characteristics, particularly education, weeks worked and location. These are much more important than other studies have implied, and constitute a significant challenge to the general observation of a rapid regression to the mean from one generation to the next. They also indicate that further study of that aspect of the inheritance of these individuals is warranted.

Canadian data also confirm the absence of differences in rates of return to human capital when all foreign-parented males are aggregated. Unlike previous work, however, this possibility is pursued explicitly in considering the role of the sex of the immigrant parent(s) in the

determination of earnings. The possibility that a foreign-born father can transmit greater ability is inquired after by examining a sample of those with such parentage. The same approach is applied to the influence suggested for a foreign-born mother. Separating the sons of the foreign-born depending upon the background - mother, father, or both together, direct support is found for the inheritance of superior ability or motivation and country-specific handicaps from parents, and for variations in this as predicted according to the sex of the foreign-born parent. Admittedly, not all predicted differences are confirmed but any significant differences support these propositions and none contradict them. It should perhaps also be pointed out that as noted in the case of foreign-born mothers, country of origin (not controlled for) may be contributing to the observed ambiguity. Were sample sizes large enough to properly control for country of origin, indications are that a clearer picture might arise.

Further consideration of the major alternative suggested in the literature, the 'sorting' hypothesis, also seems warranted. New evidence supportive of this view includes the absence of a clear 'ability' differential for sons with both parents foreign born and the appearance of appropriately greater education and success on the part of fathers (foreign-born) who married native-born women. However, it has not been possible to arrive at any evidence, direct or by inference from the possible sorting mechanisms considered, that fathers from either group were differentially able. Indeed, the one basis for sorting (on place of origin grounds) that seems to lead to the right allocation of attributes to either group of fathers, indicates the opposite of what we expect with respect to ability differentials.

Both approaches are in particular afflicted by ambiguity concerning observed ability in the third, double foreign-parent group. Ability differences of the parents aside, it seems clear that the interaction of two foreign-born parents may be the source of complications not found in the single-foreign parent case. With no native parent influence, country of origin effects are likely to be more important, and the absence of significant differences in these regressions is not really surprising given the lack of control for such factors. Further work on this group in particular is indicated.

Table II-1. Definition of Variables

DEPENDENT VARIABLE:

 LNEARN Natural log of income from employment, 1972*

EXPERIENCE, EDUCATION, WORK HISTORY, PERSONAL CHARACTERISTICS (X_i):

EDUC	Number of years in school
EXP	Number of years worked
EXP2	Number of years worked squared
LNWKS	Natural log of weeks worked, 1972*
DG**	University degree
APR**	Apprenticeship or training program completed
SELF**	Self-employed
FTIME**	Employed full time
BREAK**	Did not work for a period of at least one year since first job
NPERUN	Number of periods of 3 months or more of unemployment since first job*
MAR**	Presently married
CHILD	Number of children ever born
BXSI	Number of brothers and sisters

PROVINCE/REGION** Location 1972 (PR_i):

ATL	Atlantic Provinces (reference group)
PQ	Quebec
ONT	Ontario
PRA	Prairie Provinces
BRC	British Columbia

URBAN/RURAL** Place of Residence 1972 (UR_i):

METRO	Large urban centre (reference group)
CITY	Other city
TOWN	Small urban area
RURAL	Rural area

LANGUAGE (L_i):

LANGUAGE ABILITY**

ENG	Unilingual english
NONENG	Unilingual french or other non-english (reference group)
BILN	Bilingual

LANGUAGE FIRST SPOKEN**

LESENG	English first language spoken (reference group)
LESFR	French language first spoken
LESOTH	Other first language spoken

RELIGION** (R_i):

JEW	Jewish
PROT	Protestant
RC	Roman Catholic (reference group)
OTH	Other religion
NONE	No religion

PARENTAL HUMAN CAPITAL AND WORK HISTORY (PX_i):

MOTHER WORKED**

MWORK1	Mother worked, but for less than one year while the individual was school aged
MWORK2	Mother worked 1 to 5 years
MWORK3	Mother worked 6 years or more

MWORK4	Mother never worked (reference group)
FAOC	Blishen index for father's occupation
FAED	Father's years of education
MOED	Mother's years of education
FEAGE	Father's years of education multiplied by individual's age
MEAGE	Mother's years of education multiplied by individual's age
NOTLI**	Mother or other female was head of the household when individual was 16 years old.

FOREIGN PARENTS** (FP_i):

PARFOR	At least one parent was foreign born
MOFOR	Mother foreign born, father native
FAFOR	Father foreign born, mother native
BPFOR	Both parents foreign born

MOTHER'S PLACE OF BIRTH** if foreign (MB_i):

MOUK	Mother born in the United Kingdom
MOWE	Mother born in western Europe
MOEE	Mother born in eastern Europe
MOOT	Mother born elsewhere not in Canada

FATHER'S PLACE OF BIRTH** if foreign (FB_i):

FAUK	Father born in United Kingdom
FAWE	Father born in western Europe
FAEE	Father born in eastern Europe
FAOT	Father born elsewhere not in Canada

* values coded from class data

** indicates dummy variable, equal to one if criteria satisfied, zero otherwise.

Table II-2. Variable Means**(a) Personal Characteristics**

	CAN. PARENTS	PARFOR	BPFOR	MOFOR	FAFOR
LINEAR	8.874	9.035	9.021	9.061	9.041
(\$)	7143.80	8391.71	8275.05	8612.76	8442.22
EDUC	10.97	11.82	11.35	12.58	12.09
EXP	19.51	22.49	25.80	19.44	19.16
LNWKS	3.798	3.840	3.843	3.844	3.832
IG (%)	9.3	12.6	11.7	14.5	12.9
APR (%)	23.5	30.5	31.9	30.5	28.4
PTIME (%)	93.6	95.2	94.3	96.1	96.0
BREAK (%)	11.7	10.9	10.2	13.3	10.3
NPERUN	1.493	1.123	1.084	1.021	1.252
ENG (%)	61.3	88.3	92.3	82.5	85.9
NONENG (%)	14.4	0.6	0.1	1.2	1.0
BILN (%)	24.3	11.1	7.6	16.3	13.1
MAR (%)	95.8	95.2	95.6	94.6	95.0
CHILD	2.588	2.539	2.690	2.420	2.372
SELF (%)	14.1	18.5	22.1	12.7	16.5
ATL (%)	27.8	4.1	2.2	9.4	3.7
EQ (%)	29.0	6.9	5.3	9.1	8.2
ONT (%)	22.8	27.2	25.2	29.0	29.2
PRA (%)	14.2	41.7	47.1	31.4	39.6
BRC (%)	6.2	20.1	20.2	21.1	19.3
METPRO (%)	29.8	42.5	42.3	42.6	42.8
CITY (%)	17.4	14.2	12.5	17.2	14.9

Table II-2. (Cont'd.)

	CAN. PARENTS	PARFOR	BPFOR	MOFOR	FAPOR
TOWN (%)	16.6	16.6	17.0	14.8	17.1
RURAL (%)	36.2	26.7	28.2	25.4	25.2
LFSENG (%)	62.1	77.7	70.3	87.0	83.7
LFSFR (%)	35.4	4.1	1.0	8.8	6.0
LFSOTH (%)	2.5	18.2	28.7	4.2	10.3
JEW (%)	0.0	1.7	2.7	0.3	1.0
PROT (%)	37.4	52.2	51.7	51.7	53.5
OTH (%)	10.4	18.6	23.1	14.8	13.7
RC (%)	46.6	18.1	13.9	22.0	22.3
NONE (%)	5.6	9.4	8.6	11.2	9.5
NOTLI (%)	3.0	5.1	4.9	4.2	6.0
BRSI	5.084	3.980	4.282	3.631	3.722

Table II-2. (Cont'd.)**(b) Parental Characteristics**

	CAN. PARENTS	PARFOR	BPFOR	MOFOR	FAFOR
PAED	7.064	7.491	6.747	8.653	7.931
MOED	7.551	7.602	6.500	9.076	8.402
PAOC	33.894	34.484	31.807	38.773	35.988
NWORK1 (%)	1.0	0.7	0.5	0.9	1.0
NWORK2 (%)	5.5	7.6	6.0	8.2	9.7
NWORK3 (%)	7.6	10.6	8.6	11.5	13.1
NWORK4 (%)	85.9	81.1	84.9	79.4	76.2
FAUK	_____	33.6	39.2	_____	46.6
FAWE	_____	12.0	15.3	_____	14.1
FAEE	_____	18.1	26.4	_____	16.5
FAOT	_____	16.3	19.1	_____	22.8
MOUK	_____	29.0	39.1	48.2	_____
MCWE	_____	8.4	13.8	8.1	_____
MOLE	_____	15.1	27.6	7.2	_____
MOOT	_____	16.9	19.4	36.5	_____
N	4434	1647	813	331	503

Table II-3. Earnings Function (I)

	All Canadian Born			
	PARCAN (1)	(PARCAN & (2)	PARFOR) (3)	PARFOR (4)
EDUC	0.0425* (13.430)	0.0403* (14.673)	0.0407* (12.978)	0.0343* (6.153)
EXP	0.0329* (14.414)	0.0330* (16.181)	0.0324* (14.191)	0.0336* (7.360)
EXP2	-0.000618* (14.088)	-0.000639* (16.051)	-0.000613* (13.707)	-0.000704* (7.638)
LNWKS	0.660* (30.495)	0.662* (33.210)	0.659* (29.642)	0.688* (13.899)
DG	0.231* (7.705)	0.220* (8.586)	0.229* (7.482)	0.189* (3.803)
BREAK	-0.0868* (3.903)	-0.0963* (4.877)	-0.0916* (4.007)	-0.107** (2.543)
NPERUN	-0.00545* (2.818)	-0.00655* (3.699)	-0.00550* (2.764)	-0.0117* (2.767)
PARFOR	_____	-0.00398 (0.250)	-0.0383 (0.189)	_____
(PARFOR) • (EDUC)	_____	_____	-0.00189 (0.342)	_____
(PARFOR) • (EXP)	_____	_____	0.00322 (0.720)	_____
(PARFOR) • (EXP ²)	_____	_____	-0.000125 (1.344)	_____
(PARFOR) • (LNWKS)	_____	_____	0.0190 (0.383)	_____
(PARFOR) • (DG)	_____	_____	-0.0319 (0.584)	_____
(PARFOR) • (BREAK)	_____	_____	-0.0133 (0.294)	_____
(PARFOR) • (NPERUN)	_____	_____	-0.00554 (1.262)	_____

Table II-3. (Cont'd.)

Constant	5.123	5.204	5.207	4.934
$\bar{R}^2$	.47508	.46348	.46364	.41798
S.E.	.44935	.46276	.46269	.49409
n	4434	6081	6081	1647

Also controlled for are the bulk of the other labour supply, location, personal characteristics and family background variables listed in Table II-1.

Dependent variable is $\ln EARN$.

t-statistics in brackets; * significant at 1% level; ** significant at 5% level; *** significant at 10% level.

Table II-4. Earnings Function (II)

	All Canadian Born			Differences from (3)		
	CANPAR (1)	(CANPAR & (2)	PARFOR) (3)	(MOFOR) 3a	(FAFOR) 3b	(BPFOR) 3c
EDUC	0.0425* (13.430)	0.0403* (14.668)	0.0407* (12.985)	-0.0117 (1.036)	-0.00315 (0.338)	0.00441 (0.619)
EXP	0.0329* (14.414)	0.0329* (16.103)	0.0325* (14.212)	0.00343 (0.385)	0.0178** (2.372)	-0.00640 (0.964)
EXP ²	-0.000618* (14.088)	-0.000638* (16.015)	-0.000614* (13.724)	-0.000160 (0.805)	-0.000459* (2.781)	-0.0000800 (0.619)
LNWKS	0.660* (30.495)	0.662* (33.206)	0.658* (29.642)	-0.221* (1.845)	0.0557 (0.725)	0.0768 (1.117)
DG	0.231* (7.705)	0.220* (8.573)	0.229* (7.478)	0.0460 (0.456)	-0.0294 (0.332)	-0.0699 (0.955)
BREAK	-0.0868* (3.903)	-0.0962* (4.870)	-0.0914* (4.000)	0.0490 (0.581)	-0.129*** (1.708)	0.0340 (0.548)
NPERUN	-0.00545* (2.818)	-0.00656* (3.698)	-0.00549* (2.761)	-0.0149 (1.265)	0.00184 (0.269)	-0.0113*** (1.942)
MOFOR	_____	-0.0114 (0.417)	1.001** (2.084)	_____	_____	_____
FAFOR	_____	-0.00198 (0.086)	-0.285 (0.914)	_____	_____	_____
BPFOR	_____	-0.00137 (0.065)	-0.230 (0.806)	_____	_____	_____
Constant	5.123	5.204	5.204			
R ²	.47508	.46332	.46419			
S.E.	.44935	.46283	.46245			
N	4434	6081	6081			

Other variables controlled for as listed in Table II-1.

Dependent variable is LNEARN.

t-statistics in brackets; * significant at 1% level; ** significant at 5% level; *** significant at 10% level.

Table II-5. Earnings Function (III)

	CAN. PARENTS	PARFOR	MOFOR	FAFOR	BPFOR
EDUC	0.0425* (13.430)	0.0343* (6.153)	0.0248*** (1.807)	0.0349* (3.504)	0.0388* (4.860)
EXP	0.0329* (14.414)	0.0336* (7.360)	0.0344* (2.944)	0.0464* (5.828)	0.0229* (3.141)
EXP2	-0.000618* (14.088)	-0.000704* (7.638)	-0.000725* (2.935)	-0.00100* (5.945)	-0.000501* (3.601)
LNWKS	0.660* (30.495)	0.668* (13.899)	0.485* (3.568)	0.706* (9.475)	0.707* (9.652)
DG	0.231* (7.705)	0.189* (3.803)	0.308** (2.756)	0.180** (2.117)	0.142*** (1.865)
SELF	-0.237* (11.612)	-0.288* (8.069)	-0.508* (5.101)	-0.249* (4.058)	-0.242* (4.809)
APR	0.0821* (5.057)	0.0750* (2.711)	0.0773 (1.149)	0.0465 (0.975)	0.0751*** (1.807)
FTIME	0.150* (5.286)	0.0953 (1.634)	0.227 (1.368)	-0.129 (1.171)	0.166** (2.080)
BREAK	-0.0868* (3.903)	-0.107** (2.543)	-0.0919 (0.977)	-0.220* (3.043)	-0.0680 (1.048)
NPERUN	-0.00545* (2.818)	-0.0117* (2.767)	-0.0128 (0.950)	-0.00611 (0.922)	-0.0165* (2.683)
ENG	0.122* (2.780)	0.469** (2.541)	0.503 (1.560)	0.514** (2.018)	0.218 (0.388)
BILN	0.135* (5.125)	0.539* (3.091)	0.448 (1.507)	0.535** (2.260)	0.405 (0.731)
MAR	0.136* (3.996)	0.174* (3.018)	0.0830 (0.655)	0.165** (1.720)	0.204** (2.288)
CHILD	0.0120* (3.078)	0.0247* (3.112)	0.0166 (0.880)	0.0295** (2.192)	0.0280** (2.296)
CITY	0.0169 (0.794)	-0.0624 (1.612)	-0.0323 (0.378)	-0.110*** (1.729)	0.000395 (0.006)
TOWN	-0.0568* (2.642)	-0.157* (4.180)	-0.157*** (1.715)	-0.1599** (2.558)	-0.162* (2.877)

Table II-5. (Cont'd.)

	CAN. PARENTS	PARFOR	MOFOR	FAFOR	BPFOR
RURAL	-0.176* (8.949)	-0.284* (8.044)	-0.0262 (0.314)	-0.297* (5.096)	-0.361* (6.735)
PQ	0.0909* (3.137)	0.102 (1.166)	0.327** (1.972)	0.162 (1.063)	0.0246 (0.156)
ONT	0.161* (7.840)	0.137** (0.214)	0.130 (1.139)	0.248 (2.157)	0.125 (0.977)
PRA	0.0476** (1.990)	-0.0139 (2.086)	0.0879 (0.752)	0.0985 (0.876)	-0.0723 (0.563)
BRC	0.225* (7.087)	0.188* (2.792)	0.232*** (1.946)	0.211** (1.776)	0.200 (1.531)
LFSFR	-0.0258 (0.651)	-0.0728 (0.864)	0.0643 (0.382)	-0.0503 (0.406)	-0.240 (1.114)
LFSOTH	-0.0245 (0.528)	0.0786** (2.134)	0.00586 (0.036)	-0.0203 (0.266)	0.106** (2.298)
FAOC	0.00169* (2.629)	0.00296** (2.601)	0.00224 (0.959)	0.00336*** (1.729)	0.00296 (1.539)
JEW	-0.363 (0.805)	0.288* (2.289)	0.652 (1.236)	0.241 (1.091)	0.253** (2.037)
PROT	-0.0186 (0.877)	-0.0173 (0.467)	-0.0165 (0.185)	0.0212 (0.351)	-0.0248 (0.438)
OTH	-0.0981* (3.526)	-0.0823*** (1.894)	0.104 (0.920)	-0.0865 (1.136)	-0.127** (2.036)
NONE	-0.00550 (0.162)	0.0269 (0.515)	0.00100 (0.008)	0.0690 (0.809)	0.0274 (0.339)
NOTLI	-0.0518 (1.245)	0.0134 (0.224)	0.0956 (0.569)	0.166*** (1.727)	-0.0470 (0.523)
MWORK1	-0.0837 (1.202)	0.325** (2.250)	0.464 (1.499)	0.513** (2.446)	0.0728 (0.277)
MWORK2	-0.0843* (2.744)	-0.0337 (0.707)	-0.0415 (0.385)	-0.0852 (1.149)	-0.0216 (0.277)
MWORK3	0.0606** (2.194)	-0.0212 (0.483)	0.0861 (0.845)	-0.00966 (0.140)	-0.0894 (1.257)

Table II-5. (Cont'd.)

	CAN. PARENTS	PARFOR	MOFOR	FAFOR	BPFOR
FEAGE	0.0000488 (0.783)	-0.000103 (1.104)	0.000165 (0.706)	-0.000245 (1.626)	-0.000135 (0.938)
MEAGE	-0.000000325 (0.005)	0.000129 (1.226)	-0.000123 (0.497)	0.000115 (0.649)	0.000194 (1.186)
BRST	0.00213 (0.903)	-0.00241 (0.515)	-0.00577 (0.485)	-0.00150 (0.181)	0.00178 (0.265)
Constant	5.123	4.934	5.573	4.790	5.028
$\bar{R}^2$	.47508	.41798	.33250	.45259	.43214
S.E.	.44935	.49409	.51064	.45298	.51067
N	4434	1647	331	503	813

Department variable is LNFARN

t-statistics in brackets; * significant at 1% level; ** significant at 5% level; *** significant at 10% level.

FOOTNOTES

1. Health and Welfare Canada, for example, is currently conducting a "Review of Demography and its Implications for Economic and Social Policy" as background to this debate, and awarded twenty-one contracts for research projects in the summer of 1987.
2. Chiswick (1978, 1980), Chiswick and Miller (1984), and Meng (1987).
3. This would include Chiswick (1977), Chiswick and Miller (1984), and Carliner (1980). Testing for the effects of foreign parentage in other contexts as one in a list of explanatory variables is reasonably widespread (see for example Tomes (1983) and Meng and Sentence (1984)), but suggesting explanations for observed effects is not common. Except where such a contribution is made, this secondary literature will not be dealt with here.
4. Marr (1981) does not reproduce the whole of Chiswick's results in performing his analysis of Canadian data.
5. The transfer contemplated here does not necessarily involve inheritance in the genetic sense, although that may be a factor.
6. Sjaastad (1962) and others.
7. This evidence, from cross-sectional studies, has been questioned lately by Borjas (1985) whose work following cohorts of American immigrants suggests as an alternative hypothesis a "secular decline in the "quality" of immigrants admitted to the United States" (pg. 463). Chiswick (1986) accepts that recent changes in U.S. immigration policy may have begun to allow less qualified immigrants in, but such changes or at least their effects postdate the research upon which this literature is based. In any case, it is not clear how Borjas' institutional explanation extends to the evidence generated in other countries, such as Canada.
8. U.S. figures here and in what follows are from Chiswick (1977), Australian from Chiswick and Miller (1984). Carliner (1980) and Marr (1981) provide no comparable figures on unadjusted differentials.
9. The extent to which this is true may depend on the place of origin of the parent(s). U.K. or American parentage might not be as much of a problem in Canada as parents for example from a third world, non-english or non-french speaking nation.
10. Marr (1981) does not pursue this question.

11. Little evidence exists on this point. The lower labour force participation rates of women and the generally stated intention of female immigrants to Canada that they do not intend to work (Boyd, 1975) is an indication of differences in either interests or motivation, but not necessarily ability. What work exists on earnings of female immigrants (Long (1980) for the U.S. and Meng and Sentence (1986) for Canada) does indicate less of an ability advantage over native women in returns to experience, but this only applies to those few who work (in which context it bears noting that neither study has been corrected for selectivity bias).

12. This maternal role is more likely here than it might be today. Those included in this sample would all have been born prior to 1950, and raised when this sexual division of labour in the family was predominant. We note, for example, that 80-86% of the mothers of those in our sample did not work at all while the individual was school-aged.

In contrast, Beach and Finney (1984) hypothesize positive results only from mother's foreign birth (and expect this to be a more reliable variable than father's), referring to greater motivation and encouragement.

13. Use of this study obliges me to acknowledge the investigators responsible - M. Boyd, H.A. McRoberts and J. Porter of Carleton University; F. Jones and P.C. Pineo of McMaster University; and J. Goyder, University of Waterloo - as well as the Canada Council for its funding and Statistics Canada for the data collection.

14. The usual reason for restricting such work to males is the difficulty in estimating experience accurately for women. This is less of a problem with this data set, but for the sake of comparability, this restriction has been maintained.

15. Other work has found that regional and urban variables, for example, tend to be less significant for these presumably more mobile individuals.

16. F-tests indicate this to be true at the 1 percent level of significance for the Canadian parented group (CANPAR), for the foreign parented (PARFOR) and for the overall sample. F-test statistics generated were 3.170, 5.947, and 8.992 respectively, with (14,4399), (14,1612), and (14,6046) degrees of freedom.

17. This compares to 12 percent in the U.S. (1969 data, Chiswick (1977) and 4 percent in Australia (1981 data, Chiswick and Miller (1984)).

18. Here, as with the results that follow, additional testing indicates that the results reported are essentially independent of the inclusion of background variables (parental characteristics, family size, religion, etc.), or the use of actual rather than potential experience (the two major changes presented in this paper). Where comparable, the similarity of the conclusions presented here to those of Marr (1981) again support this consistency.

19. The role of parents in endowing their children with this investment in human capital is obviously important, and is the subject of the third paper in this thesis. These values assume the coefficients on these variables are those appropriate to all subsets of the sample, and reflect differences in characteristic means across groups. Dummy variable coefficients have been corrected for bias as suggested by Kennedy (1981).

20. Linguistic differences balance out, with the foreign-parented being less likely to be unable to speak english, but the native-parented more likely bilingual. All family background effects are small (<1 percent) or insignificant, and net out to be about even (as noted, their exclusion does not alter the finding of no adjusted difference).

21. F-test statistic generated (1.614) is significant at the 5 percent level ((35,5985) degrees of freedom). Excluding family background variables, the differences are significant at the 1 percent level.

22. Even in American estimates, where an overall earnings advantage is found, it is not accompanied by differences in these coefficients.

Several other variables (including all three urban/rural variables, and the first mother worked variable) are, however, significantly different, accounting for the Chow test results. Again, the human capital variable results are not qualitatively affected by the presence of the background variables (although the point estimates are - the PARFOR*EDUC interaction term for example changes considerably when, as in Table II-3, Column 3, the coefficients on non-interacted variables are constrained to be identical for the two groups.

23. Again this finding is irrespective of the inclusion or exclusion of family background variables.

24. It is interesting to note that what is significantly different about this mother-only-foreign group is the size of the constant term (considerably larger). This corresponds well to the equally large and equally unexplained constant differential found in estimates of the earnings of female immigrants (Long (1980) and Meng and Sentence (1986)).

25. This is more of a problem with a variable such as this where country-specificity is in question. More elaborate division of the sample for the entire paper on this basis is of some interest, but sample size limitations are prohibitive.

26. Those with mothers from the United Kingdom and Eastern Europe have significantly lower returns to education.

27. While some variables do have significant coefficient differences, Chow tests do not indicate significant overall differences in the earnings functions of the three foreign-parented groups.

28. Though here again, division on the basis of mothers' country of origin might reveal some differences.

29. That the odds would favour such a split is straightforward; the theoretical link to ability is not. A single migrant being more mobile may be able to realize greater success, but that doesn't necessarily imply much greater innate ability to pass on to children. In fact, since the single migrant is generally considered to be more mobile, there may be less selectivity involved in their movement.

30. Given the lack of theoretical clarity on what is implied here, this is almost comforting. Two specifications were used; dividing those who married before or after the year they moved, and those who married 5 years before or after migration.

31. This fits the observation that inter-ethnic marriage is less common than intra-ethnic marriage, and that the 'odds' of suitable mates within ones ethnic group being native-born are less for non-english or french speaking immigrants. There are of course differences in the tendency to intermarry, but these would tend to reinforce the observed pattern (Ishwaran, (1983)).

32. This is more true for differences in education, nearly half of which can be explained by weighting according to father's place of origin. Father's occupational status is much less a matter of mix, fathers in the PAFOR group exceeding those in the BPFOR group from the same origins by from 3 to 4 points on the Blisshen scale.

33. Although the english-speaking and western European immigrants have large and significant unexplained earnings advantages, they have no significant difference in returns to experience and lower returns to education (in comparison to the native born). The east and southern European immigrants exhibit no differences in returns to education and significantly higher returns to post-migrant experience (Meng, (1986)).

34. This appears to be true both for native-born Canadians and immigrants (regardless of ethnic origin) (Kalbach-McVey, (1979)).

35. This is a possibility that could be elaborated on somewhat more before finally dismissing it.

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CHAPTER THREE

Religion, Marital Status, and the Returns to Human Capital

INTRODUCTION

It is well known that earnings vary by religion, much as they do by race or sex.¹ The central role played in this by educational achievements is also frequently noted.² Recent studies of male earnings from the perspective of religious affiliation (Chiswick (1983), Tomes (1983, 1984, 1985) and Meng and Sentsance (1984)) have added evidence to this stock of knowledge of a positive relation across religions between not only earnings and levels of investment in, but rates of return to human capital as well.³

This latter evidence is important because, as these studies indicate, it conflicts with the implications of the hypotheses we have come to rely upon when explaining why it is that earnings and education differ (discrimination, tastes for schooling, rates of time preference).⁴ As an alternative, they argue that religion acts as an element of family background. Factors such as the inculcation of attitudes, complementarity in the early production of religious and human capital and differences in parental 'quantity-quality' tradeoffs can, it is suggested, vary from religion to religion. Productivity differences thus emerge and may explain why increased levels of schooling are observed and generally higher rates of return to human capital are found in certain religions and not in others.

Background, however, is not the only factor which can affect productivity. Tomes (1985) has suggested that religion, in affecting the institution of marriage may affect specialization and the division of labour within marriage, with consequent effects on the labour market performance and earnings of those involved. This is a proposition left

largely untested in the literature, although Tomes does conclude his paper with some interesting observations based on related work. In estimating the earnings of Canadian women by religion, he notes a general reversal of the pattern previously found for males. The latter indicates a Jewish-Protestant-Catholic ranking for earnings (Tomes (1983), Meng and Sentence (1984)), while the opposite is found to hold for women. This is certainly consistent with the suggestion that specialization and the division of labour within the household might vary by religion, and is very suggestive of some influence on earnings through religion other than, or in addition to, family background.⁵

This paper addresses that question through further estimation of male earnings across religions.⁶ The theoretical implications of marriage for human capital investment and utilization are developed from the work of Gary Becker (1973, 1974, 1981, 1985). Elaboration of this in empirical terms is found to provide a reasonable basis for measurement, and strong evidence of the expected effects on earnings, particularly through enhanced investments in experience-related human capital. Variations in these effects across religions are then examined, with emphasis on the ability of predicted differences in marital behaviour by religion to account for the stylized facts of the literature.

THEORETICAL CONSIDERATIONS

(1) Marriage

The economic analysis of marriage based on the work of Gary Becker (1973, 1974, 1981, 1985) provides a clear theoretical link between marital status and earnings. The model focuses on the possibilities

marriage presents for gains from specialization and the division of labour. Becker (1981) specifies the production possibilities of the household as a function of inputs of goods (x) and effective household time (t_h'), which are combined to produce household consumption commodities (Z):

$$(1) \quad Z = Z(x, t_h')$$

where

$$(2) \quad x = \frac{a \hat{H}^1 t_w}{P_X}$$

and

$$(3) \quad t_h' = t_h \psi(\hat{H}^2)$$

In equation (2), $(\hat{H}^1)$ is the stock of human capital applicable to the labour market, a is the rate at which this stock is rewarded, t_w is time worked, and p_x is the price of goods. In equation (3), t_h is time worked in the household and ψ is the rate at which the productivity of that time is enhanced per unit of human capital applicable to the household $(\hat{H}^2)$. The time constraint is that

$$(4) \quad t_w + t_h = t'$$

where t' is the net time remaining after maintenance of the stock of human capital.

For the household, assuming time can be readily substituted in either direction, optimality requires that the marginal products of both types of time must be equated, or that

$$(5) \quad \frac{\partial Z}{\partial t_w} = \frac{\partial Z}{\partial x} \frac{aH^1}{p_x} = \frac{\partial Z}{\partial t_h} = \frac{\partial Z}{\partial t_h'} \quad \psi(H^2)$$

This should also apply individually to those members of the household who engage in supplying time to both sectors. Those completely specialized in one sector will obviously not be so affected. While there is no necessity for the marginal product of the time spent in either sector by household members to be equated to that of other members, it is clear that what any member does will affect the value of time spent in any activity by the others, and therefore their allocation of time.⁷

Production possibilities in marriage are enhanced by a specialization of roles, which also provides an incentive for investment in further specialized human capital applicable to these roles.⁸ Becker (1985) provides an example of this incentive and the gains that accrue using Figure III-1. In this figure, the household commodity production possibilities facing an individual in a two good case are given by Z_2^S - Z_1^S , a frontier that incorporates the assumption that the human capital investments appropriate to any given division of labour/output decision have been made.⁹ Division of labour and exchange within the household allows production of either household good at the extremes and consumption at a preferred point such as B. Failure to specialize and make the additional investments implied will leave the individual members of the household at production levels such as those given by A, with a lower level of utility.

This analysis has also been extended (Becker (1985)) to include consideration of the enhanced ability to invest in human capital applicable to the labour market that might result from the reduction in involvement in the effort-intensive household sector implied by specialization.¹⁰

Those anticipating marriage and these gains will of course have some incentive to make such investments while single. As reference to Figure III-1 should make clear, however, the inability to gain from trade while still single imposes on this strategy a penalty in the form of foregone present consumption, lowering the likelihood of extensive specialization prior to marriage.¹¹

Empirical evidence exists on most of these points. Particularly well documented are male and female specialization within marriage, and to a lesser extent the gains so derived.¹² Kenny (1983) has provided some important evidence as well on the tendency of males to accumulate human capital more rapidly during marriage.

For earnings, we can draw two main conclusions from this. First, marriage will be associated with additional specialized investments in human capital. For the traditional male, specialized in the labour market, this implies more rapid accumulation of experience-related human capital (educational investments are typically completed prior to marriage). This would be observed in the form of a higher apparent rate of return to years of experience acquired while married, each of which will embody more human capital than years of single experience.¹³ Secondly, greater freedom to utilize any given amount of human capital may be reflected in higher rates of return to human capital of all types (including pre-marital experience and education).¹⁴

It should be noted that there are competing theoretical views on the observed links between marriage, human capital and earnings. One suggestion is that employers discriminate in favour of married males, both paying them higher wages, *ceteris paribus*, and investing or giving them the

opportunity to invest in more human capital on the job.¹⁵ Marriage might also be considered a selection process, with higher earnings and greater investments in human capital being observed because those who achieve marriage have been selected or select themselves for their greater ability. Evaluation of these in the context of the empirical work presented is part of what follows.¹⁶

(2) Religion

Religion can be expected to affect marital earnings in two ways: directly through specific behavioral expectations a religion might have of participants, and indirectly through individual responses to variations in the expected benefits implied by each religion's rules of marriage and their efficiency in marital sorting. The outcome, however, will be the same: we will observe variations in the degree of specialization within the household, and differences in human capital investments and their utilization.

The first influence suggested is fairly straightforward. The traditions of a religion may dictate how and what particular roles are played by marital partners. For example, the religious proscription of birth control, (if only by changing the costs involved) may affect decisions on family fertility and by extension the division of labour within the household.¹⁷ Another example from less close to home would be Islamic laws which directly circumscribe the behaviour of women, effectively reducing the choices available to them. More generally, any constraint or inducement that affects the allocation of roles within marriage may affect the degree to which specialization takes place and

gains accrue.

The second type of effect is perhaps less obvious. As recent papers by Peters (1986) and Johnson and Skinner (1986) have pointed out, the rules of marriage, particularly divorce and property settlement regulations, affect the expected duration and probability of dissolution of a marriage. This can and does have a number of effects on what is done within a marriage, including the degree of specialization (division of labour and further investment in appropriate skills) along labour force/domestic work lines.¹⁸ Religion can obviously be a factor here because the rules on marriage, divorce and remarriage vary considerably by religion. Johnson and Skinner (1986) support this presumption with estimates of differing divorce probabilities by religion.¹⁹ These probabilities in turn are found to affect observed patterns of behaviour such as labour-force participation.

The obvious differences by religion in marital practice are found in the rules of marriage and divorce. The Roman Catholic proscription of divorce or the Jewish system of religious divorce which essentially requires mutual consent are examples but other channels of religious influence also warrant consideration. Religion may act as an informational element, for example, in the process of marital sorting, with consequences for the stability of marriage which will again affect marital outcomes.²⁰

To summarize, where religion has helped make a better match or where the rules of that religion have otherwise raised the probability of a long-lasting relationship, we would expect the effects of marital status on earnings discussed above to be enhanced. For example, the differences associated with religion in marital regimes and longevity referred to here,

tentatively suggest Jews and Roman Catholics as candidates for enhanced marital status effects. This is not, of course, meant to imply that other groups will not also exhibit advantages, or that they will necessarily show the opposite, just that there are fewer a priori indications.

DATA AND SPECIFICATION

The data base used, the Canadian National Mobility Study (1973), is a cross-sectional data set collected by Statistics Canada as a special addition to the monthly Canadian Labour Force Survey of July 1973.²¹ A sample of 7845 males, 6888 married (spouse present), 957 single (never married) was obtained from it.²² Broken down by religion, in most cases this gives us reasonable sample sizes (both married and single, see Table III-2). Jews unfortunately are an exception (48 in total, only 6 of whom are single) and their results are correspondingly low in significance and should be considered in this light.²³

Six religious groups are used²⁴. Jews and Roman Catholics are considered separately as in previous work and Anglicans are also a separate group. Other Protestants constitute the remainder of the Protestant group found in earlier Canadian studies - this split is due largely to the perception that marital rules are somewhat stricter in the Anglican church. Other Christians and those with No Religion make up the last two groups. Other religions outside of the Judeo-Christian tradition were not identified on the data tape. There is strong statistical support for this breakdown of the sample, with the exception of some ambiguity on the placement of the Anglican group. These individuals are not significantly different in the determination of their earnings from the other Protestants

or the Roman Catholics, although these latter groups differ from each other.²⁵

The estimating equation is the human capital earnings function standard in the literature. The natural logarithm of annual (1972) earnings is a function of years of education, labour market experience and its square, the natural logarithm of weeks worked, and dummy variables for the region of residence and population size of locality. In line with Canadian work in this area, I have added linguistic ability and dummy variables indicating the completion of an apprenticeship or training program, and part-time or self-employed status. In the same category is a dummy variable for completion of a university degree, included by Tomes (1983) as a 'credential effect' or proxy for ability.²⁶ Other additions made possible by this data set include two work history variables which seemed particularly appropriate in the present context: the occurrence of a period of at least a year of unemployment since the individual's first job, and the number of periods of unemployment since their first job. All variables and reference groups are outlined in Table III-1.

Differences in earnings due to marital status are approached primarily by allowing rates of return on human capital (education and experience) to vary by marital status. Both separate regressions and the technique of interaction terms in pooled regressions are used.²⁷ The more specific effect of marriage on the accumulation of experience-related human capital is tested for by the addition of a years married variable, which distinguishes between years of experience while married and years while single.²⁸ Earnings, then, are a function of education, experience and other variables as follows:

$$\text{LNEARN}_i = a + b \text{ EDUC}_i + c \text{ EXP}_i + d \text{ EXP}^2 + e X_i + u$$

This equation is augmented for the married by the introduction of years of marriage (YRM) and its square (YRM²). In pooled regressions (single and married) the constant term and several other coefficients including b, c, and d are allowed to vary depending on marital status, in addition to the years of marriage term for the married. Further testing has also supported the introduction of an interaction term that allows this return to years of marriage to vary depending upon the amount of schooling received.²⁹ Unfortunately, it is not possible with these data to capture directly what the wives of these individuals are doing. An indirect attempt at capturing their degree of attachment to household labour is made by introducing the number of children into these regressions.³⁰

RESULTS

(1) Marital Status and Earnings

Estimates of these effects for the sample as a whole (all religions pooled) appear in Table III-3. Marriage, controlling for experience, education and other characteristics (Column 2), confers on males, as indicated by the coefficient estimate on the MAR variable, a highly significant 37.7 percent earnings advantage.³¹ If we then allow for differences in the returns to human capital depending on marital status by introducing variables representing years of marriage (and its square) and allow the effects of education and a degree to vary if married, we find (Column 3) strong support for the predictions made above. Years of marriage have a significant, positive impact on earnings at 1.6 percent per

year.³² The returns to years of education are about 1 percent higher as well³³. Further elaboration (Column 4) reveals as noted above that the returns to years of marriage vary positively according to the level of education achieved.³⁴ In fact, when introduced, this term (YRM•EDUC) leaves no other significant difference in the returns to education: we are left with higher earnings of about 0.75 percent per year of marriage for those men with average years of education, more for those with greater education. This is in addition to a reduced differential of 0.8 percent per year of marriage in general (the impact of YRM). The absence of any higher return to education itself or to years of experience prior to marriage is taken as an indication that the role of marriage is primarily to allow greater human capital accumulation rather than the freeing up of effort to apply to existing investments. In that regard, though, it should be noted that while rates of return as indicated by education and pre-marital experience are not apparently affected by this freeing up of effort, married men spend 5 1/2 more weeks working, have fewer career interruptions (despite longer careers) and are less likely to work part-time (see Table III-2).

The average married male from this pooled data set has about an 11 percent additional advantage from higher returns to experience (including the YRM•EDUC term), statistically insignificant advantages of 1.5 percent and 0.9 percent for higher returns to education and a degree, and a further 2 percent for having children (figures from Table III-3, Column 4).³⁵ The extra participation and greater career continuity of the married add up to about a 9 percent advantage given the coefficient estimated for the pooled data, and the lump sum effect of marriage (MAR dummy) falls with these

elaborations to 23 percent.

These data and estimates from the married sample (Table III-3, Columns 5 and 6) indicate that the major identifiable effect of marriage on male earnings is to steepen the age-earnings profile beginning, as the human capital model implies, from the date of marriage. For a married individual with average years of education, the effects are to increase earnings by 6.6 percent after 5 years, 11.5 percent after 10 years and 16.3 percent after 20 years. This advantage declines after a peak of 16.4 percent at 22 years to a 5.5 percent advantage at 40 years of marriage.³⁶ The profile will of course be higher for the more educated and lower for the less well educated.

Comparing the married results (Table III-3, Column 6) with the single (Column 7), some other differences do occur³⁷. There are higher returns for the married to apprenticeship training, and smaller losses in income when situated in smaller towns or rural areas. None of these amount to very large differences.

This support for the human capital explanation of marital earnings differences can also be compared to the implications for alternative explanations. Marriage could be seen to offer greater rewards to those with more ability through the higher return noted for education, and thus select for those with greater ability.³⁸ There is, however, considerable difficulty in explaining with ability differences the timing of higher returns (only when married), and more particularly the failure of returns from experience while single of those presently married to exceed the returns of those presently single. Ability, then, may be a factor, but it clearly must be operating in conjunction with some other effect of the type

advanced here. The discrimination view performs somewhat better - it can certainly explain employers allowing greater opportunity for investment to those married, and large unexplained constant differences such as remain here are quite often attributed to discrimination.³⁹ However, if discrimination is taking place, we would typically also expect it to bias returns to other factors, such as education and experience in general - which is not the case here.⁴⁰ The more important test for discrimination, however, is in what follows - there seems little reason to expect discrimination in favour of married men to vary systematically by religion, which is what is tested for starting with Table III-4.

(2) Religion

The primary thrust of this analysis is variation by religion in the rate of return on various types of human capital. Comparable studies - those performed using Canadian data for the time period considered here (Tomes (1983), Meng and Sentance (1984)) - tend to find higher rates of return to both education and experience for Jews, and lower rates for Roman Catholics, with Protestants as a group and Others falling in between.⁴¹

Estimates of returns to the central human capital variables for each religious group on the same basis as this earlier work (with no allowance for marital status) are presented in Table III-4. The estimated returns to experience conform to those of Meng and Sentance (1984) using the same data: Jews receive a higher return to experience while Roman Catholics and Protestants (Anglicans and Other Protestants here) fall behind, with no significant difference between them.⁴² Those with No Religion (from the Other category of previous work) receive higher returns (at varying levels

of significance) than all groups except Jews. Other Christians (also from the Other group), on the other hand, receive lower returns than these two and the two Protestant groups. Mixed support for this pattern comes from two experience related variables included in this study. Periods of unemployment (NPERUN), as would be expected are found to be detrimental to Jews, those with No Religion and Anglicans. Other groups show no significant effect, although only Other Christians and Other Protestants have significantly different coefficients from Anglicans. The effect of a break in work experience (BREAK) is again significant for Anglicans as well as Other Protestants, although these are not significantly different from the other groups.⁴³

The returns to education have previously been found to be high for Jews although they lack a 'credential effect' as measured by the degree term, and low for Roman Catholics (Tomes (1983), Meng and Sentence (1984)). Tomes also finds the Catholic 'credential effect' to be lower than that for Protestants. Prior to adjusting for marital status, the results here again match those of Meng and Sentence - with the exception that the higher returns to education for Jews indicated by the point estimate are not statistically significant.

Another point of considerable interest is the constant or intercept term in these regressions. Other work (Meng and Sentence (1984), Tomes (1983)) is again matched by the pattern found in the pooled sample (Table III-4) where no allowance is made for marital status. The constant terms for the groups comprising Others in previous work (those with No Religion and Other Christians) are significantly low, as is the point estimate for Jews (though again not significantly so).

(3) Religion and Marital Status

Estimates of the effects of marital status by religion are presented in Tables III-5 and 6. These reproduce for each religious group the equations found in the sixth and third columns respectively of Table III-3.

The most significant change that occurs is in the returns to experience, in line with the hypothesis that experience is the element of human capital most likely affected by marital status. In regressions on samples of those presently married (Table III-5), the basic returns to experience show almost no significant variation (with one exception at the 10 percent level of significance). These estimated returns are all highly significant and, with the single exception of Jews, there are no noteworthy differences in point estimates.⁴⁴ Experience related variables (BREAK, NPERUN) again show only a few differences, Anglicans and Roman Catholics having somewhat stronger effects. Results using data on both married and single males (Table III-6) confirm this pattern with one or two exceptions. Specifically, these data suggest low returns to basic experience (the EXP variable) for Catholics and Other Christians which are confirmed to be significantly lower than most other groups at levels of significance ranging from the 1 to 10 percent level. It appears that this is only true, however, because the returns to experience for single individuals in these two cases are significantly lower than for the other religions.⁴⁵

The variation previously found comes instead through differences in the effect of years of marriage, directly or through the interaction with years of education. Catholics and those with No Religion are found to receive significantly higher returns to years of marriage (YRM). The point

estimate for Jews is also high, but again does not achieve significance. Anglicans achieve smaller effects through the interaction with education, as do Catholics. Differences in marital experience variables in Table III-6 parallel those observed in the married data, with the addition of significant education interaction ($YRM \cdot EDUC$) terms for Other Christians and those with no religion. The effect is to create somewhat higher time-earnings profiles for married Catholics, those with No Religion, and Jews (not significant), primarily through the marital effects we have identified. Other groups do not achieve significantly higher profiles due to marriage; in some cases, particularly in contrast to the No Religion group, falling significantly behind the groups that do.

The overall effect is quite remarkable. It appears that variations depending on marital status are instrumental in explaining virtually all the variations in returns to experience usually noted for Canadian data. Higher returns for those with No Religion and possibly those of Jews arise through higher returns to years of marriage. The similarly greater impact on Catholics does not register in existing work due to a lower rate of return to single Catholics. Indeed the failure of Meng and Sentance (1984) to match the lower returns to experience for Catholics found by Tomes (1983) could be explained if Tomes was found to be using a higher proportion of single individuals in general or for Catholics in particular.⁴⁶ Single effects seem also to explain the weak performance of Other Christians on experience.

Several questions are also raised in this context. Given the apparent strength of marriage in the Roman Catholic and Jewish religions, we predicted stronger effects from marriage. Why those with No Religion would

also be strongly affected is, however, a bit of a mystery. One point worth noting here is that the marital dummy (MAR) in their case is both very large and negative. Perhaps the strong effect of years of marriage in this instance reflects the fact that those marriages that do last are (or become) those that have allowed for greater specialization and gains. Success may bind these couples together while the less successful separate for lack of other ties. Marriage in general for this group, however, need not be an unusually rewarding experience (more along the lines we might have predicted a priori).⁴⁷

Another question raised is why there are lower rewards for experience to single Catholics and Other Christians. An obvious response given the present framework would be some variation in investments made on the job while single in anticipation of different returns when married. For Catholics in particular, however, this would appear to imply the opposite (greater investments in anticipation of higher returns) to what we find. Differences in the ability to make or finance additional investments while single may be a more likely explanation. This implies looking back to the family and their resources, in which context it is interesting to note that the two groups in question come from the largest families, obtain the least amount of education, and tend to marry earliest.⁴⁸

For the returns to education the impact of allowing for marital status is again clear although not as dominant in the explanation of observed differences in returns between religions as in the case of experience. This is expected to some degree as variations in the process of investing in educational capital almost certainly result from factors that pre-date marriage. There may, of course, still be differences in the degree of use

of such capital.

In pooled data (Table III-6) four of the six groups considered demonstrate some significant interaction. Those with No Religion exhibit higher returns to education itself if married, somewhat offset by a negative interaction with years of marriage ($YRM \cdot EDUC$). For Roman Catholics, Other Christians and Anglicans education contributes through the $YRM \cdot EDUC$ term to their marital accumulation of on-the-job experience. Anglicans, however, suffer a reduced return to education if married.

Marital status also tends to affect the existence of differences in returns to education between these groups. Among those presently married (Table III-5), for example, the relative position of Catholics improves - they are no longer significantly behind Anglicans and Other Christians in returns to education. The lower returns of Catholics in comparison to Protestants and those with No Religion are offset somewhat by a significantly higher $YRM \cdot EDUC$ term. The relative position of those with No Religion is also enhanced. Their returns to education significantly exceed those of all groups with the exception of the Jews. For those not married, the coefficient on education in the pooled data (Table III-6) indicates further advantages for both Protestant groups over Catholics, and rather weak (in fact insignificant) effects of education on earnings for Other Christians, Jews, and those with No Religion.

Several points should be emphasized here. One is that quite consistently, the groups for whom marriage positively affects the returns to experience (Catholics, No Religion, Jews (point estimates), and to a lesser extent Other Christians) are those whose returns to education are enhanced in some way in marriage. Secondly, the variations that were found

in preliminary estimates (Table III-4) appear to originate in developments (quite possibly related to family background) that pre-date marriage: the significantly lower returns reported for Catholics are more obvious in the absence of marriage, and are in fact slightly ameliorated by it. Finally, it is worth noting that some differences in the returns to education appear in fact to be masked by the impact of marriage. Differences for Other Christians and individuals with No Religion in particular are considerably lower if single, while those for Anglicans are considerably higher. Marital effects, however, bring these back to the rest in the pooled data.

With regard to 'credential effects' the usual pattern (Meng and Sentence (1984)) holds again in pooled data (Table III-4). Interestingly, the lower effect Tones (1983) attributes to Catholics again appears here as a phenomenon affecting single Catholics. The return to a degree for those married (Table III-5) is not lower than that found elsewhere. Once again the discrepancy that arises in previous work on this variable could be explained if Tones were found to have used a larger proportion of single individuals in his estimates. Somewhat puzzling on the other hand is the apparent difference in the size of this 'credential effect' if married for Jews and those with No Religion. Here it is notably smaller if married (the reverse of the Catholic case), indicating that once married the 'credential' makes no difference for Jews and those with No Religion, but begins to make a difference for Catholics.⁴⁹

In previous work significant differences in constant terms have also been noted. Allowing for marital status and years of marriage (Table III-6), all such differences disappear. None are significantly different and of the point estimates only that for Jews is really out of line. The

difference is taken up in the married status dummy term: that for No Religion is negative and significant (and significantly different), for Jews negative but insignificant. For all others it is positive, though not always significant, as with Other Christians. With some variation, the married sample (Table III-5) finds the reappearance of the constant differences, as we would expect. In addition to significantly lower values for Other Christians and those with No Religion, that for Anglicans is somewhat higher (balancing other marital or single effects).

Several points can be made about the other independent variables⁵⁰. The earnings of self-employed Jews have been found in the past to be higher, in contrast to the effect of self-employment elsewhere. This is again apparently confirmed (Table III-5). A second difference commonly noted for Jews is a higher coefficient on weeks worked. This is not found here. It appears that the difference may be due to the introduction of a part-time employment variable (PART) not used in Meng and Sentence (1984).⁵¹ The effect of this new variable for Jews is much larger (and negative) than for other groups, raising the suspicion that in its absence the effect may have been picked up through some correlation with weeks worked.

SUMMARY AND CONCLUSIONS

Marital effects have been shown to comprise a significant portion of the determination of male earnings. The returns to experience in particular are enhanced depending upon the number of years one has been married. This appears to be the result of greater opportunity for investment in experience-related human capital while married. These

effects have also been shown to vary by religion as predicted . Where marriage is made more secure and the division of labour with the implied gains from specialization is encouraged by more restrictive religious customs or better sorting, these effects tend to be larger. Indeed, beyond a simple marital status dummy, only in the cases of those with No Religion and Roman Catholics do the marital status variables introduced significantly contribute to these regressions.⁵²

Most importantly, however, these effects have been shown to explain a significant portion of the variation by religion previously found in the returns to human capital. Until now, the only consistent explanation for these has been found in the impact of family background. Family background is, obviously, still to be considered an important factor, notably in determining differences in the returns to years of education. In other areas, however, such as the return to experience, it seems the bulk of observed variation depends upon the degree to which different religions promote added returns to experience through marriage.

Recognition of these effects also improves considerably our understanding of previous results. Some inconsistencies in previous Canadian work for this period (Tomes (1983), Meng and Sentance (1984)) have already been noted as potentially the result of differences in the ratio of single to married individuals in the sample chosen. Using this format, it also seems possible to explain the change observed by Tomes (1985) using 1981 data: a reduction in the Jewish advantage but the perpetuation of Catholic disadvantages. The overwhelming fact of the decade that passed between these studies is the change in the security of marriage and the accelerated breakdown of the division of labour within marriage. This

implies a reduction in marital effects which the results presented here suggest would not significantly affect Protestants, but would hurt the earnings of Jews and reduce those of Catholics as well - matching the pattern shown by Tones.

Reference to the legal framework may also explain the tendency to fewer differences between religions found in Quebec data from 1971 (Tones (1983)). Prior to Divorce Act changes in 1968 individuals from all religions in that province faced a high cost of divorce - obtaining a federal act of Parliament. The civil law in Quebec had also encouraged the widespread use of marriage contracts.⁵³ Both of these differences from the rest of Canada may have had an equalizing effect across religions on the incentives to specialize within marriage.

A somewhat more ambitious undertaking would be to explain the reversal of Catholic/Protestant differentials across the border in the United States (Tones (1984), Chiswick (1983)). The present study does provide the basis for something of a Catholic advantage over Protestants in terms of marital effects. A lessening or reversal of other differences between these groups could then produce the results noted.

More work remains. Obvious directions to be taken include an attempt to test the simple explanations offered here for the change observed in moving to 1981 data, or the U.S./Canada difference in the ranking of Catholics and Protestants. The other area where more effort is also needed is examination of the impact marital status has on the earnings of women of different religions, and more elaboration within a study of male earnings of the actual behaviour of their wives. It is notable in this regard that the pattern found by Tones (1985) for women fits our expectations for Jews

and Protestants, but does not completely mesh with our understanding of what is happening in Catholic marriages. Finally, the prevalence of and the effects of interfaith marriage need to be considered more explicitly. It seems likely that some of the strength shown in marital effects for Jews and Roman Catholics is due to the rarity of intermarriage for these groups. It is also possible that the performance of males with No Religion may be better understood when the religions of their spouses are known.

Table III-1. Variable Definitions

LNEARN	Natural log of income from employment, 1972*
EDUC	Number of years in school
EXP	Number of years worked
EXP2	Number of years worked squared
DG**	University degree
LNWKS	Natural log of weeks worked, 1972*
BREAK**	Did not work for a period of at least one year since first job
NPERUN	Number of periods 3 months or longer of unemployment since first job.
APP**	Apprenticeship or training program completed.
SELF**	Self-employed
PART**	Employed Part-Time
LANGUAGE ABILITY**	
ENG	Unilingual English (Reference Group)
FREN	Unilingual French
BILN	Bilingual
PROVINCE/REGION** Location 1972	
ATL	Atlantic Provinces
QUE	Quebec
ONT	Ontario (Reference Group)
PRA	Prairie Provinces
BC	British Columbia

URBAN/RURAL** Place of Residence 1972

ME100 Large Urban Centre (Reference Group)

MCITY Medium City

TOWN Small Urban Area

RURP Rural

NC100 Number of Children

MAR** Married

YR* Years Married

RELIGION**

JEWISH

ROMAN CATHOLIC

ANGELICAN

OTHER PROTESTANT United Church, Presbyterian,
Dutch Reform, Lutheran

OTHER CHRISTIAN

NO RELIGION

* values coded from class data

** indicates dummy variable, equal to one if criteria
satisfied, zero otherwise.

Table III-2. Variable Means

(a) Married and Single

	All	Anglican	Oth Prot	R. Cath.	Oth Chri	Jewish	No Relig
INEARN	8.857	8.956	8.910	8.808	8.733	9.400	9.002
(S)	7,093.97	7,754.28	7,405.66	6,687.53	6,204.31	12,088.38	8,119.31
EDUC	11.189	11.550	11.488	10.547	10.900	13.708	12.884
EXP	19.464	20.629	20.622	19.115	19.547	20.438	16.261
DG (%)	11.7	12.6	11.2	9.8	12.6	33.3	18.5
WEEKS (LN)	3.797	3.795	3.824	3.781	3.801	3.823	3.797
(#)	44.6	44.48	45.79	43.86	44.75	45.74	44.12
BREAK (%)	11.9	11.2	9.7	12.5	14.1	6.3	14.9
NPENUN	1.416	1.299	1.132	1.620	1.592	0.459	1.136
APP (%)	24.3	26.5	26.0	22.7	19.3	8.3	28.4
SELF (%)	14.3	10.7	17.8	11.4	18.5	19.2	12.3
PART (%)	3.9	2.3	2.6	5.6	2.0	4.2	5.1
FREN (%)	10.2	-	1.1	24.9	0.4	-	0.9
BILN (%)	20.8	7.6	5.1	42.1	3.2	41.7	13.6
MCITY (%)	16.4	19.4	16.4	16.0	16.0	12.9	13.2
TOWN (%)	16.1	12.2	16.9	17.5	16.9	2.1	13.0
EURF (%)	34.0	32.4	35.3	32.7	42.0	-	27.2
ATL (%)	21.6	29.9	20.5	20.1	34.6	-	9.4
QUE (%)	22.5	4.4	4.0	50.6	2.3	35.4	6.9
PRA (%)	21.0	18.9	31.3	10.1	32.6	29.2	20.2
BRC (%)	11.1	15.7	12.0	4.0	10.0	4.2	34.6
CHILD	2.293	2.238	2.198	2.514	2.302	2.146	1.659
MAR (%)	87.8	91.1	90.0	86.6	86.0	87.7	83.0
YRM	12.840	14.070	14.003	12.195	13.076	13.917	9.745
MAR.ED	9.739	10.499	10.289	9.025	9.281	12.000	10.500
MAR.DG	.102	.114	.103	.033	.104	.292	.150
n	7845	931	2278	3060	693	43	552

Table III-2. (Cont'd.)

(b) Married Sample

	All	Anglican	Oth Prot	R. Cath	Oth Chri	Jewish	No Relig.
INEARN	8.927	9.006	8.950	8.875	8.784	9.416	9.088
(S)	7,532.63	8,151.85	7,785.36	7,150.95	6,528.94	12,283.35	8,848.47
EDUC	11.092	11.527	11.428	10.421	10.792	13.714	12.655
EXP	20.499	21.537	21.449	20.185	20.542	20.500	16.889
EG (%)	11.6	12.5	11.4	9.6	12.1	33.3	18.1
WEEKS (LN)	3.813	3.814	3.836	3.793	3.819	3.821	3.822
(#)	45.3	45.33	46.34	44.39	45.56	45.65	45.70
BREAK (%)	11.5	11.2	9.1	11.9	13.9	7.1	14.2
WEDDING	1.392	1.268	1.080	1.641	1.542	0.500	1.535
APP (%)	25.7	28.4	26.8	24.2	21.5	9.5	29.7
SELF (%)	14.5	10.5	17.5	12.2	18.0	28.6	12.9
PART (%)	3.5	2.2	2.4	5.2	1.7	4.8	4.1
PRON (%)	0.8	-	1.0	24.2	0.5	-	0.9
BLEN (%)	20.4	7.7	5.0	42.6	2.9	42.9	11.6
MULTIV (%)	16.5	19.3	16.6	16.3	16.1	19.0	13.1
TOWN (%)	16.9	12.5	17.4	18.3	18.1	2.4	14.6
RURF (%)	33.4	32.3	34.3	32.1	41.3	-	27.1
ATL (%)	21.8	29.7	20.1	20.5	35.7	-	9.4
QUE (%)	21.3	4.1	3.9	49.9	1.7	33.3	6.1
PRA (%)	21.1	19.2	31.2	10.3	30.7	26.2	21.0
BAK (%)	11.2	15.4	12.0	4.2	10.2	4.8	36.7
CHILD	2.597	2.454	2.434	2.981	2.664	2.333	1.980
YRMAR	14.624	15.447	15.553	14.082	15.205	15.905	11.745
YRM.ED	150.028	163.140	167.491	131.548	153.253	199.571	138.664
YRM.ED	1.381	1.748	1.606	.893	1.634	3.429	1.736
YRM ²	324.235	350.999	353.689	307.769	342.188	359.429	229.181
EXP-YRM	5.9	6.1	5.9	6.1	5.3	4.6	5.1
(EXP+ED-5)							
- YRM	22.0	22.6	22.3	21.5	21.1	23.3	22.8
n	6888	848	2051	2650	596	42	453

**Table III-3. Earnings Functions (I),
Marital Status Effects, All Religions Pooled**

	(MARRIED AND SINGLE POOLED)				MARRIED		SINGLE
	(1)	(2)	(3)	(4)	(1)	(2)	
EDUC	0.0391* (16.594)	0.0393* (17.047)	0.0392* (5.991)	0.0295* (5.627)	0.0420* (17.221)	0.0322* (8.774)	0.0332* (3.267)
EXP	0.0397* (23.916)	0.0326* (19.539)	0.0226* (10.627)	0.0207* (9.497)	0.0246* (9.919)	0.0222* (8.558)	0.0179* (3.582)
EXP2	-0.000732* (21.092)	-0.000617* (17.854)	-0.000436* (10.872)	-0.000421* (9.804)	-0.000197* (10.460)	-0.000411* (9.160)	-0.000661* (3.25)
OC	0.206* (9.414)	0.192* (8.979)	0.117** (2.169)	0.119** (2.196)	0.186* (9.198)	0.194* (8.598)	0.131** (1.985)
LAWRS	0.662* (36.129)	0.637* (37.354)	0.639* (37.607)	0.641* (37.703)	0.630* (33.214)	0.621* (33.392)	0.696* (16.299)
BREX	-0.104* (5.850)	-0.101* (5.758)	-0.102* (5.876)	-0.101* (5.815)	-0.099** (5.771)	-0.095** (5.214)	-0.113** (2.169)
NDPRN	-0.00515* (3.149)	-0.00530* (3.313)	-0.00562* (2.518)	-0.00550* (3.450)	-0.00591* (3.52)	-0.00574* (3.471)	-0.00417* (0.811)
APP	0.0901* (6.902)	0.0742* (5.790)	0.0720* (5.637)	0.0693* (5.420)	0.0764* (5.903)	0.0737* (5.695)	0.0177* (5.332)
SELF	-0.252* (15.047)	-0.249* (15.141)	-0.247* (15.469)	-0.252* (15.404)	-0.240* (14.299)	-0.248* (14.18)	-0.279* (6.366)
PART	-0.165* (5.769)	-0.146* (5.215)	-0.141* (5.057)	-0.147* (5.036)	-0.149* (4.582)	-0.143* (4.159)	-0.148** (1.86)
FRON	-0.150* (5.293)	-0.147* (5.273)	-0.150* (5.456)	-0.151* (5.444)	-0.159* (5.297)	-0.157* (5.297)	-0.176* (1.216)
BHFN	-0.00128 (0.070)	-0.00113 (0.063)	-0.00191 (0.110)	-0.001792 (0.044)	0.00179 (0.096)	0.00194 (0.107)	-0.00167 (0.24)
*CITY	-0.0145 (0.845)	-0.0192 (1.147)	-0.0217 (1.286)	-0.0208 (1.24)	-0.0177 (0.736)	-0.0131 (0.799)	-0.0164 (1.27)
TOWN	-0.0848* (4.957)	-0.102* (6.052)	-0.101* (6.045)	-0.101* (6.03)	-0.0831* (4.876)	-0.0939* (5.096)	-0.109* (6.27)
WURF	-0.227* (14.913)	-0.227* (15.236)	-0.229* (15.496)	-0.227* (15.429)	-0.221* (14.331)	-0.217* (14.636)	-0.229* (6.25)

Table III-3. (Cont'd.)

ATT	-0.172* (9.950)	-0.176* (10.416)	-0.177* (10.506)	-0.178* (10.570)	-0.180* (10.341)	-0.181* (10.417)	-0.152** (2.503)
QUE	-0.0617* (2.642)	-0.0537** (2.348)	-0.0511** (2.241)	-0.0502** (2.205)	-0.0458*** (1.921)	-0.0488*** (1.878)	-0.0799 (1.096)
PRA	-0.145* (9.579)	-0.143* (9.674)	-0.145* (8.828)	-0.146* (8.873)	-0.155* (9.151)	-0.156* (9.209)	-0.049* (0.839)
BC	0.0773* (3.843)	0.0770* (3.911)	0.0761* (3.876)	0.0755* (3.850)	0.0708* (3.512)	0.0704* (3.491)	0.120*** (1.690)
NDHED	-	-	0.00645*** (1.824)	0.00790** (2.220)	0.00391 (1.118)	0.00526 (1.494)	-
YR1	-	-	0.0164* (6.402)	0.00762** (2.201)	0.0156* (5.724)	0.00777** (2.248)	-
YR4	-	-	-0.000392* (5.916)	-0.000341* (5.045)	-0.000375* (5.520)	-0.000337* (4.924)	-
MARK100	-	-	0.0109** (2.041)	0.00138 (0.233)	-	-	-
MARK10	-	-	0.0678 (1.154)	0.0749 (1.276)	-	-	-
MARK	-	0.320* (18.371)	0.0933 (1.431)	0.212* (2.933)	-	-	-
YR100	-	-	-	0.000670* (3.779)	-	0.000644* (3.694)	-
Constant	5.718* (77.994)	5.622* (77.928)	5.807* (65.223)	5.824* (65.396)	5.904* (73.445)	6.040* (63.337)	5.812* (31.896)
R ²	.4416	.4646	.4688	.4697	.4379	.4389	.4216
S.E.	.4867	.4767	.4742	.4735	.4601	.4597	.5639
n	784	7845	7845	7845	688	6888	957

Dependent variable is LNDRG:

t-statistics in brackets; * significant at 1% level;
** at 5%; *** at 10%.

**Table III-4. Earnings Functions (II),
Married and Single Pooled, By Religion, No Marital Status Effects**

	All	Anglican	Other Prot	R. Cath.	Oth Christ	Jewish	No Reliq.
EDUC	0.0391* (16.584)	0.0466* (7.379)	0.0421* (8.620)	0.0320* (9.174)	0.0389* (4.526)	0.0737* (3.704)	0.0513* (5.461)
EXP	0.0397* (23.916)	0.0399* (8.425)	0.0404* (11.983)	0.0360* (14.941)	0.0281* (4.524)	0.110* (5.574)	0.0586* (7.666)
EXP ²	-0.000732* (21.092)	-0.000718* (7.291)	-0.000746* (10.500)	-0.000666* (13.604)	-0.000556* (4.143)	-0.00213* (5.995)	-0.00109* (5.492)
DG	0.206* (9.414)	0.209* (3.689)	0.234* (5.606)	0.182* (5.049)	0.156** (2.076)	-0.156 (0.908)	0.196** (2.476)
APP	0.0901* (6.901)	0.0821** (2.372)	0.0987* (4.164)	0.0772* (3.741)	0.137* (2.730)	-0.137 (0.562)	0.0134 (0.362)
BREAK	-0.104* (5.850)	-0.104** (2.128)	-0.102* (2.741)	-0.136 (5.067)	-0.0529 (0.891)	0.309 (1.057)	0.0117 (0.918)
NPERON	-0.00515* (3.149)	-0.0119* (2.586)	-0.00230 (0.669)	-0.00377 (1.618)	-0.000422 (0.078)	-0.195** (2.110)	-0.0112** (1.761)
Constant	5.728* (77.999)	5.850* (31.973)	5.777* (37.974)	5.542* (53.243)	5.412* (19.561)	4.554* (4.038)	5.194* (18.043)
R ²	.4416	.4887	.4226	.4433	.4447	.7460	.4737
S.E.	.4862	.4410	.4925	.4694	.5091	.3726	.4477
n	7845	931	2278	3060	69	48	2

Dependent variable is LNFEARN.

Also controlled for are the other variables used in Table III-1.

t-statistics in brackets; * significant at 1% level; ** at 5%; *** at 10%.

Table III-5. Earnings Functions (III),
Married Only, By Religion

	All	Anglican	Oth Prot	R. Cath.	Oth Chris.	Jewish	No.Relig.
EXPC	0.0320* (8.774)	0.0221** (2.226)	0.0443* (5.570)	0.0241* (4.554)	0.0293** (2.149)	0.0646*** (1.679)	0.0763* (5.232)
EXP	0.0220* (8.558)	0.0191** (2.417)	0.0282* (5.307)	0.0190* (5.437)	0.0290* (2.960)	0.0707*** (1.874)	0.0286** (2.348)
EXP ²	-0.000441* (9.160)	-0.000376* (2.597)	-0.000558* (5.523)	-0.000382* (6.035)	-0.000636* (3.256)	-0.00141** (2.277)	-0.000562** (2.095)
EX	0.194* (8.508)	0.226* (3.756)	0.196* (4.516)	0.215* (5.893)	0.140*** (1.771)	-0.293 (1.201)	0.0364 (0.408)
LNWKS	0.631* (33.392)	0.545* (10.855)	0.611* (15.436)	0.637* (24.547)	0.881* (12.030)	0.483 (1.796)	0.615* (6.800)
YR1	0.00777** (2.248)	-0.0000480 (0.005)	0.00655 (0.972)	0.0112** (2.173)	-0.00864 (0.745)	0.0315 (0.689)	0.0472* (3.113)
YR1 ²	-0.000337* (4.924)	-0.000209 (1.072)	-0.000116 (0.872)	-0.000512* (5.096)	0.0000645 (0.272)	-0.00133 (1.566)	-0.000722** (2.177)
YR1*LNWKS	0.000644* (3.694)	0.00103** (2.189)	0.0000133 (0.036)	0.000860* (3.287)	0.000948 (1.482)	0.00111 (0.476)	-0.00123 (1.519)
BREATH	-0.0955* (5.214)	-0.127** (2.523)	-0.0969** (2.486)	-0.106* (3.916)	-0.0458 (0.753)	0.388 (0.889)	0.0120 (0.181)
NEEDLE	-0.00574* (3.471)	-0.0152* (3.164)	-0.00217 (0.602)	-0.00577** (2.573)	0.00213 (0.383)	-0.133** (2.293)	-0.0105 (1.502)
APP	0.0737* (5.692)	0.0647*** (1.855)	0.0997* (4.099)	0.0404** (2.029)	0.117** (2.380)	-0.0721 (0.276)	0.0462 (0.911)
SEMI	-0.238* (14.185)	-0.0835 (1.609)	-0.283* (9.334)	-0.163* (6.071)	-0.371* (6.573)	0.486* (3.011)	-0.404* (5.847)
PAINT	-0.128* (4.556)	-0.189*** (1.842)	-0.208* (2.974)	-0.124* (3.276)	-0.0399 (0.256)	-1.168* (3.988)	0.0569 (0.501)
FRUN	-0.177* (5.387)	-	-0.201 (1.619)	-0.202* (3.826)	-0.731** (2.046)	-	-0.362 (1.403)
BLEN	0.00295 (1.257)	-0.125*** (1.932)	0.00138 (0.026)	-0.0265 (1.080)	0.0595 (0.434)	-0.285 (1.218)	-0.0134 (0.168)

Table III-5. (Cont'd.)

	All	Anglican	Oth Prot	R. Cath.	Oth Chris.	Jewish	No Reliq.
MCITY	-0.0121 (0.700)	-0.131* (2.961)	0.0116 (0.351)	0.0132 (0.508)	0.000142 (0.002)	-0.317 (1.079)	-0.00897 (0.126)
TOWN	-0.0838* (4.896)	-0.0837*** (1.678)	-0.0628*** (1.927)	-0.0676* (2.670)	-0.135** (2.098)	-1.091*** (2.007)	-0.00771 (0.111)
RURF	-0.211* (13.656)	-0.270* (6.456)	-0.232* (7.854)	-0.151* (6.479)	-0.279* (4.742)	-	-0.147** (2.451)
ATT.	-0.191* (10.417)	-0.145* (3.422)	-0.150* (4.756)	-0.232* (7.872)	-0.142** (2.458)	-	-0.190** (2.167)
QUE	-0.0448*** (1.878)	0.0622 (0.724)	0.0109 (0.156)	-0.0838* (2.730)	0.233 (1.099)	0.478*** (2.016)	0.0697 (0.540)
PRA	-0.156* (9.209)	-0.139* (3.092)	-0.160* (5.869)	-0.111* (3.273)	-0.118** (2.054)	0.0721 (0.253)	-0.215* (3.215)
BC	0.0704* (3.491)	0.0696 (1.482)	0.0452 (1.262)	0.0401 (0.865)	0.129*** (1.708)	0.126 (0.281)	0.0981*** (1.665)
NCHILD	0.00526 (1.494)	-0.00877 (0.859)	0.00951 (1.153)	0.00370 (0.748)	-0.0151 (1.187)	0.0248 (0.369)	0.0751 (1.441)
Constant	6.040* (68.337)	6.599* (28.860)	5.937* (31.556)	6.145* (49.400)	5.107* (14.893)	5.822* (3.944)	5.354* (13.038)
R ²	.4389	.4450	.3987	.4777	.4676	.7338	.4108
S.E.	.4597	.4337	.4775	.4280	.4799	.3361	.4651
n	6888	848	2251	2650	596	42	418

Dependent variable is LNEARN.

t-statistics in brackets; * significant at 1% level; ** at 5%; *** at 10%.

Table III-6. Earnings Functions (IV)
Married and Single Pooled, By Religion, Marital Status Effects

	All	Anglican	Oth Prot	R. Cath.	Oth Chris.	Jewish	No Relig.
EDUC	0.0295* (5.827)	0.0682* (4.728)	0.0442* (3.383)	0.0198* (2.834)	0.0136 (0.717)	-0.117 (0.893)	0.0174 (0.970)
EXP	0.0207* (9.497)	0.0278* (4.040)	0.0308* (6.749)	0.0143* (4.737)	0.0140*** (1.711)	0.0723** (2.357)	0.0397* (3.846)
EXP ²	-0.000421* (9.804)	-0.000532* (4.069)	-0.000612* (6.665)	-0.000297* (5.216)	0.000318*** (1.818)	-0.00138** (2.643)	-0.000700* (2.847)
IG	0.119** (2.196)	0.194 (1.275)	0.296** (2.348)	-0.0556 (0.648)	0.285*** (1.661)	1.050 (0.951)	0.353* (2.595)
APP	0.693* (5.420)	0.0644** (1.885)	0.0976* (4.111)	0.0424** (2.145)	0.113** (2.253)	-0.0854 (0.343)	0.00705 (0.145)
BREAK	-0.101* (5.818)	-0.120** (2.501)	-0.0934** (2.545)	-0.124* (4.820)	-0.0563 (0.954)	0.479 (1.250)	0.00724 (0.116)
INTERIN	-0.00550* (3.450)	-0.0122* (2.704)	-0.00260 (0.761)	-0.00507** (2.287)	0.00131 (0.241)	-0.124** (2.283)	-0.0141** (2.165)
YRM	0.00762** (2.201)	-0.00570 (0.591)	0.00527 (0.786)	0.0122** (2.320)	-0.00564 (0.477)	0.0306 (0.693)	0.0413* (2.682)
YRM ²	-0.000341* (5.045)	-0.0000607 (0.325)	-0.0000639 (0.492)	-0.000561* (5.550)	-0.000160 (0.680)	-0.00135 (1.644)	-0.000594*** (1.823)
MAR*EDUC	0.00138 (0.233)	-0.0435* (2.643)	-0.0000218 (0.002)	0.00130 (0.274)	0.00739 (0.327)	0.184 (1.378)	0.0643* (2.887)
MAR*IG	0.0749 (1.276)	0.0392 (0.232)	-0.0994 (0.746)	0.267* (2.848)	-0.157 (0.824)	-1.340 (1.202)	-0.360** (2.085)
YRM*EDUC	0.000670* (3.779)	0.000958** (2.055)	-0.0000412 (0.112)	0.000941* (3.476)	0.00140** (2.130)	0.000942 (0.433)	-0.00112*** (1.797)

Table III-6. (Cont'd.)

	All	Anglican	Oth Prot	R. Cath.	Oth Chris.	Jewish	No Reliq.
NCHILP	0.00790** (2.220)	-0.00848 (0.637)	0.0102 (1.365)	0.00721 (1.432)	-0.0132 (1.006)	0.0296 (0.511)	0.0284 (1.596)
MAR	0.212* (2.933)	0.799* (3.926)	0.238 (1.333)	0.213** (2.208)	0.127 (0.472)	-2.150 (1.426)	-0.718** (2.380)
Constant	5.824* (65.386)	5.529* (22.485)	5.656* (26.737)	5.941* (47.451)	5.634* (17.751)	7.500* (3.736)	5.685* (16.184)
R ²	.4697	.5082	.4383	.4959	.4562	.7367	.4800
S.E.	.4738	.4325	.4858	.4467	.5039	.3285	.4852
N	7845	931	2278	3060	693	48	552

Dependent variable is LNEARN.

Also controlled for are the other variables used in Table III-3.

t-Statistics in brackets; * significant at 1%; ** at 5%; *** at 10%.

Figure III-1Gains from specialization and exchange

FOOTNOTES

1. Roman Catholic earnings exceed Protestant in the United States (Chiswick (1983), Tomes (1984)), while the opposite is true in Canada (Tomes (1983)). Jewish earnings exceed all others in both countries, in 1971 in Canada by 80 percent (Tomes (1983)).
2. In the case of Jews this has led to some interesting theorizing to explain their greater investments in education - such as the 'Diaspora effect' recently suggested by Brenner and Kiefer (1981), a tendency to invest in portable assets (such as education) in the face of the recurrence of events such as the holocaust.
3. The earnings differentials noted above in the United States and Canada are found to be matched by levels of investment in education and differences in the rates of return to education and experience (Chiswick (1983), Tomes (1983, 1984), Meng and Santance (1984)).
4. Chiswick (1983) has one of the better discussions of the logic of this argument. Larger investments as explained by these hypotheses appear to be the result of factors which shift out the supply curve for human capital (other opportunities less highly valued, therefore funds made more readily available). This would imply a shift down the demand curve, higher investments, but a lower rate of return.
5. Given the typical timing of education and marriage, it is of course more likely that this influence will manifest itself in the context of investments in and returns to experience-related human capital. There is no necessary conflict here with family background also affecting investments, in education or even experience.
6. While the effects of marriage on women are obviously interesting, they are also different enough to warrant separate consideration. Technical details of estimation and the desire to maintain comparability to the existing literature are further factors in the choice to restrict the focus of this paper to males.
7. In the sense that what one member does will affect the marginal product of household time in the sector affected, and that the rest of the household will act as appropriate to re-establish equilibrium.
8. The labour force specialist has traditionally been the male (see Becker (1981) for an attempt at explaining this) although it seems clear this sexual allocation of roles in marriage is to some extent breaking down (see Matthaei (1980) and the special issue of the Journal of Labor Economics on "Trends in Women's Work, Education, and Family Building", Vol. 3 (No. 1, pt. 2) (1985)).

9. Thus the convexity. Implicitly underlying any point on this PPF is a more ordinary concave PPF outlining the possibilities given that allocation of labour and the specialized investments made on that basis.
10. While Becker has formalized this discussion, it has been presented before (Matthaei (1980)).
11. Becker (1981) notes the difficulty presented by the lack of a mate to 'trade' with. An interesting possibility for further work is the option of specialization of this sort while single within the parental household.
12. Time-use studies indicate a clear division of household labour (Becker (1985) refers to a number of these). On the link between the wife's labour force participation and husband's hours of work and earnings, recent research would include Peters (1985) and Johnson and Skinner (1986). Michael (1985) also discusses this link with some reference to past work.

Overall gains in the sense of full income are, as Michael (1985) points out difficult to quantify. Gains in terms of husband's earnings are, however, found widely (Miller (1987) provides recent Canadian evidence). It is sometimes suggested that rising divorce rates in the context of the recent breakdown of the sexual division of labour within marriage can be taken as evidence that the gains depend on this and are diminishing at the same time.

13. Even if the actual return on a unit of human capital were the same, each year of experience would represent more units of job-related human capital. Miller (1987) has found recently for Canadian data that this is in fact the case (higher returns to years of experience while married).
14. This freedom may of course also manifest itself in greater hours of work or weeks worked and be captured in part through these variables. Little evidence on this is available (rates of return), although clearly married males do work longer hours and more weeks.
15. This is a possibility that has received surprisingly little explicit consideration in the literature. Reference to the general literature on discrimination reveals a number of ways in which discrimination could arise in this context, the most likely of which is statistical discrimination. Given non-trivial turnover costs, a rational employer in a world of less than perfect information may seek and use indicators (such as marital status) of stability, in order to reduce turnover. Forms of prejudice - the feeling that the married male needs or deserves a job (raise, training) more so than the single man - may also be at work.

16. Some discussion of this latter view is found in Kenny (1983). He argues that his results are awkward for the sorting hypothesis in finding no evidence of greater ability for the married in what they do while single. More generally, the marriage literature does consider ability to be a factor in age at marriage (Keeley (1977), Becker (1981)), but aside from models with no lack of information and no transactions costs it is not clear that marital status is a good predictor of ability. Some further testing using selectivity-bias correction is perhaps indicated.
17. A similar difference in costs is behind the hypothesized effects of religion on earnings through parental quantity/quality decisions. There it is the costs facing the parents, here the costs facing the individual and their own spouse.
18. Both Peters (1986) and Johnson and Skinner (1986) find state to state differences in divorce legislation to affect women's (and by implication husband's) labour force participation.
19. Religion actually has more of an effect on these probabilities than divorce legislation has. Correcting for other variables, Baptists are found to be a high risk, Jews low. Canadian data, presented largely by sociologists, typically does not control for other variables, but does indicate different probabilities as well - Roman Catholics in particular being less likely to divorce (Ishwaran (1983)).

Another factor not always considered is that interfaith marriages have been found to be on average less stable (Becker, Landes and Michael (1977)). The incidence of intermarriage in Canada is again much lower for Jews and Roman Catholics (Kalbach and McVey (1979)). The data referred to here unfortunately do not include spousal religion.

20. See Becker, Landes and Michael (1977) and Becker (1981).
21. Use of this obliges acknowledgement of the principal researchers - M. Boyd, H.A. McRoberts and J. Porter of Carleton University, F. Jones and P.C. Pineo of McMaster University and J. Goyder of the University of Waterloo as well as the Canada Council for funding and Statistics Canada for the data collection.
22. The selection criteria are as in Meng and Sentance (1984): Canadian born males, with positive weeks worked and earnings in 1972, ages 22 to 64 inclusive.

Divorced, widowed and separated individuals have been dropped due to the impossibility of determining their years spent married. Where appropriate, however, some testing was done for these individuals, with results as noted.

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23. Jews by religion are placed in the other religion category in this data set, forcing their identification through ethnic status and adding to the sample size problem. Those selected stated both their own and their ancestors ethnic status to be Jewish, and do not belong to another identified religion (as in Meng and Sentence (1984)).

The robustness of results with an only slightly larger sample (Meng and Sentence (1984)) does, however, indicate these results can be accorded somewhat more weight than would usually be the case.

24. These groupings depart from previous Canadian work, but are certainly not out of line with the rest of the literature. Tomes (1984) considers an even further breakdown of Christian denominations for example. The meaningfulness of the Other grouping has also been questioned.
25. Chow tests were performed on the basis of both the basic model with no allowance for marital status (Table III-4) and the married sample with allowances made for the effects of marriage (Table III-5). In the latter case, all groups, with the exceptions noted and Other Protestants compared to No Religion are significantly different at the 1 percent level of significance. In the basic regressions, aside from Anglicans again not different from Catholics and other Protestants, three pairings only reach the 5 percent level of significance for their differences. Other Protestants and No Religion, Other Protestants and Other Christians, and Anglicans and No Religion.
26. Tomes (1984) allows for non-linearity in returns to education by splitting years of education at the end of high school, suggesting a third explanation, differences in the quality of education at various levels.
27. All differences between religions in human capital and marital status variables have been tested through interaction terms. Other differences are tested for significance as suggested by Tomes (1983) by generating t-statistics using

$$t = (\beta_i - \beta_j) / (\alpha_i^2 + \alpha_j^2)^{1/2}$$

28. This variable is sometimes used in estimating female earnings, but with few exceptions (such as papers concerning male/female earnings differentials such as Miller (1987) and Polachek (1975)) is not found in male estimation. The square of years married is also included, allowing the impact of these investments to decline over time (as experience squared does).
29. This was tried because it has been suggested that greater schooling or the ability reflected in greater schooling may enhance the accumulation of human capital (Becker (1975) pg. 91) and this is a somewhat special period in which human capital accumulation is particularly accentuated.

There is also the possibility that the high correlation between spouse's education might allow this to capture the tendency noted by Benham (1974) for earnings to vary depending on the wife's education and length of marriage (pp. 381-382).

30. Miller (1987) also uses the age-structure of children, but his results indicate their ages are not as big an issue for males as they naturally are for females.
31. Coefficients on dummy variables have been corrected using the formula suggested by Kennedy (1981), the corrected value equalling $e(c-1/2v(c))_{-1}$ where $v(c)$ is the variance of the estimated coefficient c . Estimates of previously married individual's earning generate advantages of about half this (with little variation depending upon how the marriage ended) (see Appendix table 3).
32. Somewhat offset by the significantly negative YRM^2 term.
33. These additions are found to significantly increase the explanatory power of the regression using an F-statistic generated by the formula

$$F_{K,N-Q} = \frac{(SSR_1 - SSR_2)/K}{SSR_2/(N-Q)}$$

where K is the number of added variables, Q the total number of variables used. A variety of specifications (see Appendix Table A-1) were considered for this regression and uniformly, although point estimates are slightly higher, the rate of return to the pre-marital experience of the married is not found to differ significantly from that for experience in the single sample (and so no attempt to incorporate such a difference is shown in Table III-3).

34. Again using the F-test a significant improvement to the regression.
35. By comparison, the impact of experience on the average person's earnings (evaluated at the means of EXP , EXP^2) is 20.4 percent.
36. These are generated using the married sample - similar results are obtained using pooled data. At this peak of 22 years married the overall benefit of basic experience is by comparison 27.1 percent (assuming $EXP = YRM + (\text{average } EXP - \text{average } YRM)$).
37. A Chow test indicates the two groups are significantly different in the determination of their earnings at the 1 percent level of significance.
38. Particularly if education is highly correlated to ability. There is, of course, also the view that education may provide more learning skills or the apparent ability to make investments more efficiently.

39. Human capital investments while married of course would still be central to this explanation. This merely shifts the focus from family helping finance to employer assistance. In fact, some combination of these effects is quite likely.
40. This expectation will be stronger if the discrimination suggested is of the prejudicial type. Statistical discrimination in allocating investments in employee human capital would not be expected to produce these results.
41. Meng and Sentence (1984) do not find lower returns to experience for Roman Catholics, although Tones (1983) does.

United States data (Chiswick (1983), Tones (1984)) confirms Jewish advantages but in contrast suggest Catholics outdo Protestants. Tones (1985) has also presented results for Canada for 1981. Protestant/Catholic differentials remain, but Jewish advantages by and large have been eliminated.

42. Selection procedures are somewhat different here, raising the possibility that results would not automatically be repeated.
43. All differences between groups noted have been tested using interaction terms in pooled regressions.
44. Excepting Jews the peaks of age-experience profiles range only from 23 to 36 percent, whereas the uncontrolled pooled data had a range from 35 to 86 percent. Jews peak at 72 percent and 138 percent higher earnings due to experience respectively in either case.
45. Single results are based on a pooled regression of single individuals allowing the major variables to vary by religion. While some differences do exist for single individuals by religion, only in the case of Other Christians is the return to experience while single lower than that of pre-marital experience for the presently married.
46. Tones does not give details on this. Sample selection procedures for the two data sets do allow for some such differences.
47. The same explanation may also be needed for the return to education, where again higher returns accompany marriage.
48. Families may assist their single children, even after leaving the household. These groups appear to have fewer resources for each child, perhaps reducing their ability to invest in human capital. On the other hand, less education might reduce one's stock of skills useful in human capital investment.

49. Further speculation leads us back to the uncertainty in the literature as to how to treat this effect. Tomes (1984) for example, drops this term altogether, substituting instead a term allowing years of education before and after high school completion to vary in their impact on earnings.
50. Differences noted here have been tested for significance using the t-test noted above (n. 26).
51. Chiswick (1983) on introducing an hours worked variable to his model finds reduced coefficients as suggested here, but not by enough to eliminate a significant difference in favour of Jews.
52. Each group was tested as marital status variables were added in the sequence given in Table III-3, Columns 2 to 4. While all but Jews indicate the inclusion of marital status variables as a whole (moving from Column 1 to Column 4) is a significant improvement at the 1 percent level, as noted only the two groups find the transition from Column 2 to Column 4 an improvement (even dropping to the 5 percent level). Individual variables in this group (of additional marital status effects), however, may be significant inclusions (as indicated by their t-statistics and significant F-tests on the inclusion of the YRM*EDUC term for Anglicans and Other Christians).
53. A survey in the mid 1960s indicated about 70 percent of married couples had contracts (Kronby (1981)).

Table III-A-1. Specification of Marital Experience

	(1)	(2)	(3)	(4)
EXP	0.0226 (10.627)	0.0218 (9.474)	0.0192 (7.588)	0.0203 (8.418)
EXP ²	-0.000456 (10.872)	-0.000463 (10.854)	-0.000400 (8.050)	-0.000425 (9.264)
YRM	0.0164 (6.402)	0.0157 (5.776)	-	-
YRM ²	-0.000392 (5.916)	-	-	-
MAR•EX	-	0.00157 (0.879)	-	-0.000150 (0.078)
MAR•EX ²	-	*	-	*
PRE EX	-	-	0.00211 (0.814)	-
PRE EX ²	-	-	-0.000105 (1.314)	-
POST EX	-	-	0.0194 (6.648)	0.0189 (6.164)
POST EX ²	-	-	-0.000454 (5.954)	-0.000430 (5.808)
$\bar{R}^2$	.4688	.4688	.4691	.4690
S.E.	.4742	.4742	.4740	.4741

Dependent variable is LNFARN.

Also controlled for are other variables used in Table III-3.

Table III-A-2. Dummy Variables - Marital Status

(a)	NOTM	-0.293 (16.009)
	WID	-0.202 (3.022)
	DN	-0.187 (3.442)
	SEP	-0.185 (4.442)
(b)	NOTM	-0.293 (16.013)
	PREVM	-0.189 (6.292)

Reference group Married (spouse present).

From pooled regression controlling for other variables as in Table III-3, Column 1.

Table III-A-3. MAR Coefficients

Anglican	0.301 (5.580)
Other Protestant	0.283 (7.905)
Roman Catholic	0.380 (14.935)
Other Christian	0.214 (3.594)
Jewish	0.109 (0.677)
No Religion	0.207 (3.274)
All	0.320 (18.371)

From separate regressions similar
to Table III-3, Column 2. (No other
allowance made for marital status.)

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CHAPTER FOUR

Ethnicity, Education and the Returns to Human Capital: the Role of Family Background

INTRODUCTION

This essay focuses on investments in and rates of return to education of Canadian ethnic groups. The approach is based on the model used by Barry Chiswick (1986) in his attempt to provide a consistent economic rationale for similar patterns of ethnic and racial differences in these investments in the United States. This is a fairly straightforward application of the economics of fertility to the influence of family background on education and earnings. Group differences in factors affecting fertility choices lead parents to make different 'quality' investments in the child, including both years of education and home inputs that enhance the productivity of that education.

Empirically this involves the construction and testing of a three equation model of the major steps in this process - the determination of parental family size, own education, and earnings. The adequacy of this approach is measured by its ability to explain observed differences in these elements across ethnic groups. The aim is to avoid excessive reference to factors such as tastes or rates of time preference. These tend to be ad hoc in nature, and recent studies have questioned the consistency of their implications with empirical evidence.¹

While a considerable debt is obviously owed here to Chiswick, his contribution is primarily to the theoretical background. The lack of appropriate data has not allowed him to explicitly specify and test an empirical model of the sort presented here. Putting

this into a Canadian context has also meant departures. Ethnic group as opposed to racial divisions are the obvious focus. The nature of the immigrant or minority experience is also thought to have differed considerably.² Examination of these differences is a second focus of the essay.

THEORETICAL BACKGROUND

(1) Traditional approaches

The standard framework for analyzing investments in and rates of return to educational human capital is the supply and demand model developed earlier by Becker and Chiswick (1966). Demand is determined by the marginal rate of return on the investment (a derived demand), and slopes down due to diminishing returns and because more education shortens the period over which returns can then be earned.³ Those with more ability, whether innate or the product of parental inputs, will generate higher returns from the same years of education and will have a higher demand curve. Differences in school quality could have similar effects, as could unequal treatment of investments of given quality in the labour market (discrimination). Supply represents the marginal cost of obtaining the necessary funds, including opportunity costs. Those with access to cheaper sources of funding will have lower supply curves.

Chiswick (1983a, 1986) argues that in this framework, traditional approaches to group differences explain variations in

educational attainment through factors (tastes, discount rates, discrimination) that imply shifts in the supply curve. With regard to the taste argument he notes that "groups for whom non-money returns are important will be willing to invest more funds at any given interest cost"⁴. This implies a supply of funds schedule that lies to the right of average ($S'S'$ in Figure IV-1). A similar conclusion is reached for the discount rate differences sometimes suggested - "groups with a lower time preference for current consumption will supply funds at a lower interest cost".⁵ Mapped out along the demand curve, these different group supply curves will generate a negative correlation across groups between years of schooling and rates of return. Chiswick has collected a considerable body of evidence indicating that this is in fact not what is observed.⁶ Rather, the correlation is a positive one, more schooling accompanying higher rates of return.

(2) Canadian Ethnicity

Much the same can be said for Canada. Little work directly links Canadian ethnic groups to evidence on these matters, but there are indications in related studies. The literature on religion and human capital (Tomes (1983)(1985), Meng and Sentence (1984)) for example, finds a positive correlation across these groups between years of education and the rate of return to schooling. To obtain more direct evidence a set of preliminary earnings functions was estimated for eight Canadian ethnic groups. When ranked by years of education, the rates of return

(Table IV-1) show a clear tendency to diminish as years of education fall.⁷ The arguments examined by Chiswick appear to have the same difficulty with Canadian evidence.

This evidence also appears to be inconsistent with arguments specifically addressed to these educational differences between Canadian ethnic groups. This primarily sociological literature explains the stratification of ethnic groups in Canada on occupational lines in terms of blocked mobility. More specifically the newer 'ethnic' groups perform poorly because their socio-economic mobility is blocked by the established 'charter' groups.⁸ Education plays a major role in this. Lower levels of education are thought to be associated with certain ethnic groups in part because immigration policy actively selected this way in the past - as with the active recruitment of uneducated rural peasants from south-eastern Europe to fill up the west in the first decades of this century.⁹ They persist because ethnic communities and community involvement "may deflect status aspirations and restrict achievement motivations", thus limiting "the acquisition of individual qualifications, especially education, which most count toward ensuring occupational mobility".¹⁰

The vehicle (ethnic community) is different, but this explanation of sustained Canadian differences in education and occupation is similar to what has been advanced elsewhere. Decisions regarding investments in education vary because 'aspirations' vary - because the willingness to commit funds to

this investment has been conditioned differently by one's point of reference, the ethnic community. A restricted supply of funds for education such as the curve SS in figure IV-1 (S^1S^1 taken as normal) is implied. Less education will be sought, despite what may be high marginal rates of return.

(3) An alternative approach

To be consistent with the data, any explanation of group differences in education will apparently have to work primarily through shifts in the demand curve. The most obvious way in which demand can vary is through differences in the productivity of given investments. The other logical possibility on the demand side is that there are differences in the rewards offered to holders of investments of given productivity, due to discrimination. A major deficiency with this latter approach, however, is in explaining how some groups that have been discriminated against achieve more education and high rates of return¹¹. Jews are the best example of this, although certain groups like the Chinese and Japanese in the United States have been shown to fall into the same category¹².

Productivity differences can arise in a number of ways. As Becker (1981) in particular has suggested, differences in innate ability could give us such a result by generating in effect more human capital from a given year in school. Differences in school quality could conceivably also generate such a result (Morgenstern (1973)), although in most instances sufficient segregation does

not exist to make this an important factor. A third possibility forms the basis of this paper - that complementary investments in the home can increase the productivity of a given year of schooling. Specifically, Chiswick (1986) has suggested that the key to this may be parental fertility decisions and their implications for the tradeoff between quality and quantity. A choice tending to quantity at the expense of quality will imply fewer additional inputs, a lower return to any level of education (a lower demand curve) and consequently less education achieved and a lower rate of return. This argument, unlike that for discriminatory treatment, can also be reversed, generating higher achieved education and rates of return with fewer siblings and more parental inputs.

Chiswick's American data and preliminary estimates presented for Canadian ethnic groups are consistent with the implications of this approach for the interaction of supply and demand in the market for education. Chiswick's greater concern, and the focus of this paper, is for more empirical evidence on the determination of the parental quality investments which this approach suggests create the productivity differences which lead to shifts of the demand curve for education. Some evidence at the descriptive level has already been advanced: attained levels of education across groups, for example, have a strong inverse correlation with numbers of siblings. As the Canadian data in Table IV-1 indicate, this inverse ranking is in fact nearly perfect.¹³ Much, however, remains to be examined and explained.

The main empirical hurdle to be overcome is that these background quality inputs are unobservable in themselves. The theory of fertility choice and that of educational investment, however, suggest that these are connected to variables which can be observed: attained education and the quantity dimension of parental fertility choice. These can be examined with regard to the extent to which they are systematically related to a given set of variables representing the opportunities and constraints parents face. The extensive literature on both quality/quantity decisions, and on the determination of educational investments, certainly provides an ample list of such factors for consideration, and some evidence as to their roles in generating the results we are interested in.¹⁴

Parental education and income/occupational status are the most obvious factors involved. More highly educated parents are thought to face a relatively lower price of quality (higher price of quantity) for a number of reasons. First, their time is generally more valuable, and quality is less time-intensive than quantity. Such parents can also ease the learning process: healthier children are better able to learn, and home inputs from better educated parents can give the child an advantage as well though as women with more education do tend to work more they may be less available for contact time with the child. It is also the case that if there is a greater income elasticity for child quality than for quantity, there will be a shift to the former at higher incomes.

Location may also influence the cost of various aspects of fertility. It can, for example, be important in determining the value of parental (particularly mother's) time. It is also generally accepted that the price of quantity is lower in more rural areas, one major difference being the cost of space.

Religion too can be a factor. Most important there are differences in the psychic costs of controlling fertility, which can vary depending on the view a religion takes regarding birth control. Given its importance in marriage, religion should also be expected to act in other, perhaps more subtle ways.¹⁵

In the end, of course, the level of education (and the amount of home input) attained is determined by more than parental choices of quality and quantity. Individual ability for example is obviously extremely important, though difficult to evaluate empirically. Changing circumstances as one grows up and pursues education are also important. Families can move, or split up, changing the relative costs and their ability to influence the process.

The suggestion is, then, that factors such as these will be able to explain differences across groups in parental quality/quantity decisions. These decisions together with other determining variables, may then explain the demand shifts that lead to differences in educational attainment. These investments together with their productivity are instrumental in explaining the earnings differences observed. Perhaps equally important, since many of these factors will be constants or will be

regenerated from generation to generation, they may be the basis for explaining the persistence of these group differences over time.¹⁶

DATA AND SPECIFICATION

The data base used, the Canadian National Mobility Study (1973), is a cross-sectional data set collected by Statistics Canada as a special addition to the monthly Canadian Labour Force Survey of July 1973.¹⁷ This data base is superior to census data for the present study in that it provides a wide variety of information on parental characteristics (education, occupations, nativity), family circumstances (number of siblings, place of birth, ethnic and religious background) and life history (place of residence at 16, family unity at that date).

A sample including individuals from a background in the following nine ethnic groups was obtained: more dominant groups such as the French, English, Irish and Scottish; and "ethnic" groups of more or less recent immigrant status such as the Germans (less recent), Jews, Poles, Ukrainians and Norwegians (more recent). Non-European groups were unfortunately not available for analysis separately in these data. Other large ethnic groups such as the Italians though listed in the data base were apparently too recent in origin to make up a satisfactory individual sample from those satisfying the imposed criterion of Canadian birth.¹⁸ The Jewish sample is also somewhat small, and their results should be considered carefully.¹⁹

Initial testing consists of estimates using the entire sample, into which dummy variables representing these nine groups are entered. In further testing, which examines the determination of parental fertility and own education group by group, the degree to which these groups differ enough to be considered separately was examined. Chow tests based on the three equations of the model indicate that the Ukrainian, Polish and Norwegian groups do not differ significantly enough to warrant separation. All other groups demonstrated differences in at least one equation and on that basis, were considered separately.²⁰ The Jewish sample was dropped because of sample size problems in individual equations.

The model developed is of the following form:

$$(1) \quad Q_j = a \ Y_{ij} + U_{1j}$$

$$(2) \quad S_j = b(Q_{j-1}) + c \ X_{ij} + U_{2j}$$

$$(3) \quad E_j = d \ S_j + e \ Z_{ij} + U_{3j}$$

where Q , S and E are parental fertility, individual schooling and earnings respectively, Y_i is a vector of parental and background characteristics applicable at birth, X_i is a vector of similar variables at age 16, and Z_i is a vector of the same variables at the time of data collection.

As specified, each equation relates to a stage in the process that builds on the former, meaning that the model has a triangular endogenous-coefficients matrix. Full recursiveness which would allow estimation using ordinary least squares, however, also requires a diagonal variance-covariance matrix of the structural

disturbances.²¹ This was tested for using the procedure adapted by Beach and Finney (1981) from Hausman (1978). This procedure amounts to including the residuals from the first half of a two-stage least squares procedure in OLS regressions of the structural equations (i.e. those from equation (1) in equation (2) and those from equation (2) in equation (3)) and testing for their significance. In this case, with one such inclusion in any equation, this reduces to a simple t-test. The results suggest that the correct procedure is to estimate the first two equations using OLS techniques, and the third equation by 2SLS, using the fitted values for education obtained from the second equation.²²

Parental fertility (equation (1)) includes a variety of factors affecting the relative prices of quantity and quality and is also affected, of course, by the resources of the parents. The variables used include a number of the influences noted above, including parental education (years of schooling for either, and the completion of a degree), father's occupational status, mother's years of work while the individual was of school age, religion, province of birth, foreign birth of either or both parents, and age (as a time trend).

Equation two, years of completed education, takes into account parental inputs as determined by the above factors, both directly and through the number of siblings²³. Other factors included are those influencing the individual as they proceed with their education. As well as the number of siblings, parental education, work and immigrant status variables, age and religion,

variables are included to indicate region or urban-rural size of place of residence when 16, language first spoken, and the unity of the family unit (parents) when the individual was 16.

The earnings function is the standard human capital earnings function used elsewhere. The natural logarithm of annual (1972) earnings is expressed as a function of human capital variables (education, experience), length of work (weeks, part-time) and other labour market history or job characteristics (self-employed, repeated or long breaks in work history). As with previous Canadian work, two 'credential' variables (university degree, apprenticeship or training program) and linguistic status are included.²⁴ Also included are personal and locational characteristics (marital status, number of children, region and urban/rural size of residence) and those background variables which previous work (Meng and Sentence (1984)) and preliminary estimates indicated had a direct impact on earnings (father's education and occupation, mother's work, and foreign birth of any parent). Precise variable descriptions appear in Table IV-2, means in Table IV-3 and Table IV-A-1.

The results are discussed at a number of levels. The first evaluation (Table IV-4), considers the model as estimated using the entire sample, asking whether it exhibits effects as predicted and how much variation is explained by these variables. The variable means for the different ethnic groups are then considered in terms of their contributions to the overall observed differences in the explained variables. Following this discussion

of the extent to which the proposed theoretical link can explain ethnic differences in family size and education in terms of prices or resources available, some further issues are addressed.

One important issue is the basis for the means and their differences from group to group. Much of this may be a function of past chance: immigration policy when parents entered, and the stage of development of the Canadian economy - where the growth was taking place and in what sectors. The interesting question is whether this pattern is being perpetuated.

The other major point of interest is the possibility of a difference in the determination of fertility or educational investment given the various costs (coefficient differences as opposed to means). Individual group regressions have been run for these two equations to provide the results necessary to consider this (Tables IV-5 and IV-6).

Overall, the focus is as stated in the introduction: to establish the reasonableness of the process suggested, and to assess the degree to which differences across ethnic groups are due to the fact that given their circumstances they face different costs and constraints and therefore make different choices. The alternative, of course, is that after controlling for differences of this sort, there may still be significant variation. This may have to be explained in an ad hoc manner on a group by group basis, perhaps referring to peculiar Canadian circumstances. On reflection, however, further progress may be possible on more usual economic terms.

RESULTS

(1) Pooled Regressions

Estimation of the model for the sample as a whole is presented in Table IV-4. Generally, the variables chosen perform as expected. The majority are significant with correct signs and reasonable magnitudes. The earnings function (Column 3) is standard, background variables as in other studies having only a slight influence (only father's occupation and degree and mother's work being significant).²⁵ The schooling equation (Column 2) confirms our expectations regarding most factors. One's mother having a degree unexpectedly lowers one's education level, but there are enough ambiguities in the interaction of mother's education or work to possibly account for this. Parental fertility (Column 1) is left largely unexplained (judging by the low R^2), but the variables used, particularly the value of mother's time variables, are generally significant and act as expected with the possible exception of a father's degree.²⁶

Beyond the basic credibility of the model our interest at this level is twofold. First we are concerned with the capacity of the model to account for the observed differences across groups that are the subject of our study. A second point of interest is the consistency with which the model does this - whether all groups are equally well accounted for, and whether the explanation emphasizes similar factors from group to group.

(a) Residual differences

In terms of reducing the range of unexplained group differences in earnings, education and parental fertility, the model is quite successful. Over half of such differences are accounted for based on comparisons of the dummy values for Ethnic status included in each equation (Table IV-4) and the unadjusted gaps found in the raw data (Tables IV-3 and IV-A-1). This is a high proportion in cross-section work.

The unadjusted earnings gap between Jews (highest) and the French (lowest) which stood at 76 percent of the mean of the English reference group, is more than cut in half to 27 percent. In this adjusted data, the Irish replace the French at the bottom of the list with a point estimate .0250 below the English reference group, and the Jewish-French gap falls to 22 percent. Similarly, the range of completed years of education is reduced from the 3.85 difference between the Jews and the French to 1.59 when adjustments are made, Poles replacing the French as the group least educated. The gap for siblings falls from 3.72 to 1.80, in both instances the difference between Jewish and French values.

The reductions made, moreover, appear to be in large part the result of explanatory variables central to the analysis. Of the 54 percentage point reduction in the size of the Jewish-French earnings differential, for example, 32 points are due to education (years and degrees). Up to 2/3 of a year of the education difference is explained by the number of siblings. Other parental

variables such as education and father's occupational status also tend to reduce the gap.²⁷ Parental fertility varies between groups as expected for a variety of reasons, including parental education and occupational status. The overwhelming factor in explaining the wide Jewish-French difference here, however, is religion, specifically differential membership in the Roman Catholic church which alone explains a one sibling difference between these groups.

(b) Consistency across groups

Some variation in the relative importance of different variables is to be expected from group to group. Somewhat more of a failing given our objective is a lack of consistency in accounting for overall differences between groups. For example, the model's success in explaining French/English differences is considerable. These groups have among the widest differences found in the raw data, and yet most of these are accounted for. In all three equations the point estimate of differences is considerably diminished and the remaining difference is significant only for parental fertility where the data are arguably least complete. At the other extreme the model generally fails to explain Jewish differences. Significant differences are retained in all three equations, and the major portion of the actual difference remains unexplained. Significant adjusted differences are also found in one or more cases for Poles, Ukrainians, and Scots (Table IV-4).

Differences across groups in the importance of specific factors are to be expected and a few exceptional cases should be noted. The major point of interest here is the ability of education to explain earnings differentials. In some cases, this is clearly a dominant factor, as with the 24.5 out of 40 percentage point drop in unexplained Jewish/English earnings differences. Poles, on the other hand, with an adjusted, significant 15.1 percent earnings advantage over the English, have actually had their gap increased because their education differences would generate even lower earnings. Other cases in which the model actually creates significant differences include the education of Ukrainians, where a 0.83 years higher adjusted level of education appears in the place of an actual 0.18 year disadvantage, and the completed fertility of Polish and Ukrainian parents, where fewer siblings are indicated by the model rather than the actual greater numbers.

Overall, the high proportion of group variation in earnings, education and parental fertility accounted for by the model provides considerable support for Chiswick's approach. It appears that the unexplained portion of the range of outcomes across ethnic groups can in fact be more than cut in half by treating these differences as the result of a common process involving the opportunities and constraints faced by individual ethnic groups. Considerable support is also advanced for the less easily measured aspects of this approach. Parental fertility decisions are shown to be important in generating the differences that largely account

for observed earnings gaps. Based on this quantity/quality tradeoff, the demand for education is arguably the determining factor in that market, consistent with Chiswick's explanation of the positive correlation between years of education and the rate of return.

The pooled data also make it quite clear, however, that it is appropriate to examine further the possibility that the model is not consistent in its application to all groups, and to look for the causes of these differences.

(2) Separate Regressions

Estimates of the parental fertility and education functions for individual ethnic groups appear in Tables IV-5 and IV-6. As can be inferred from this manner of presentation, the testing of differences across groups in the determination of these equations revealed that these variations were indeed significant enough to warrant separating the sample in this manner.²⁸ As noted the Jewish group has been dropped due to sample size problems, and the Ukrainian, Polish and Norwegian groups have been combined on the strength of Chow tests which reveal no significant overall differences between these in any of the equations of the model. All other groups appear here individually, having demonstrated significant differences in at least one equation. Variations by groups in the earnings function, beyond the returns to education noted in Table IV-1 are not sufficiently at issue here to justify further examination.

The general impression presented is similar to that drawn from the pooled data, that is, considerable support for Chiswick's approach. While significantly different in many cases from group to group, the determination of both parental fertility and own education demonstrate general conformity. In both cases, the significant variables are usually consistent in sign and the same variables tend to achieve significance from group to group. Differences do arise, but are generally confined to the magnitude of given effects.

At the same time, particularly at the level of parental fertility decisions, there is a less than random pattern of differences across groups - which groups differ from which, and on the basis of what coefficient differences. Generally speaking the groups which dominate Canada numerically (and perhaps in other ways) behave uniformly - the English, Scots and Irish, and to a lesser extent the French. Smaller groups, of more recent standing in Canada, appear to react differently to any given set of circumstances, although within these other groups the manner in which they differ from the mainstream is relatively consistent.

(a) Parental Fertility (Table IV-5)

Clear differences exist at a number of levels in the determination of parental fertility. Chow tests indicate that at the overall level the English, Irish, and Scottish do not differ substantially from each other in how parental fertility is determined. The French however, differ significantly from all three, at the 1 percent level for the English and Scottish, 5

percent for the Irish. Germans match this pattern; the Germans and the French showing no significant differences. The pooled Ukrainian, Norwegian and Polish group (obviously similar themselves) shows significant differences from the others at the 1 percent level of significance, 5 percent for differences from the Germans.

Individual coefficient differences were tested for significance through interaction terms in pooled regressions.²⁹ For the sake of comparability to the earlier discussion of group differences and to impose some order and economy estimates of differences from the coefficients estimated for the (English) reference group are the focus.

The three 'english-speaking' groups as noted have essentially similar parental fertility functions. Inspection of the coefficients generated (Table IV-5) reveals no differences in sign among significant variables from each other or the pooled results in Table IV-4 and few differences in magnitude. Only the coefficients for No Religion among the Irish and Atlantic birth for Scots are significantly different, both larger, than those for the English.

The French show no differences in sign among significant variables from either the pooled regression (Table IV-4) or the three other dominant groups. There are, however, significant differences in the magnitude of estimated coefficients. Relative to the English, the coefficient for father's occupation is significantly larger, as are the effects of the second mother

worked category and birth in Quebec. The effects of mother's education are weaker, and the constant term is significantly higher.

With Germans the differences become more significant, in the sense that the magnitude of coefficients is not the only difference. Father's occupation again has a stronger impact, as does the first mother worked category. Mother's education and membership in the Roman Catholic church are significantly less important, and the effect of both parents being foreign-born is actually reversed, here adding 1.14 siblings where for both Scots and the English the effect is to reduce parental family size.

The final group, Ukrainians, Poles and Norwegians, again depart significantly from the pattern set by the English and the sample as a whole. Here there are at least two cases where the sign of significant variables is reversed (birth in Quebec actually reducing parental family size by 2.03 siblings, and a foreign born mother increasing family size by 1.29). Father's occupation, age, and Protestant status have stronger effects, while both parents being foreign born and father's education have weaker effects than are found for the English. Perhaps the largest single deviation, however, is the constant term, which at 3.99 is significantly low.

Overall, the general consistency of the model is still supportive of Chiswick's attempt to generalize the explanation of education and earnings differences. However, it is fair to reiterate that beyond the three 'english-speaking' ethnic groups,

there are significant differences across groups in how fertility is determined. Of particular interest is the degree to which categorizing these differences is facilitated by reference on a descriptive level to the explanation of educational achievement differences provided by Canadian sociologists. That is, expected family size variations can be further developed along the lines of ties (or the absence of ties) to the traditional ethnic community.

Within the Ukrainian/Polish/Norwegian group, for example, a sharp distinction can be drawn between those whose background falls into the 'traditional' ethnic community category - characteristics typical of the majority of the parental generation - and those who do not. Several factors linking individuals to these communities add significantly to the size of their family of origin. These include foreign-born mothers, the Catholic (if Polish) or Protestant (if Norwegian) religions and age (over 40 would imply parents who lived in Canada or who immigrated before the depression, well back into the selective period of Canadian immigration policy). In comparison to the relevant reference groups - Canadian born parents, Anglicans, younger, the difference is about 3.2 to 3.9 siblings, depending on which religion is taken. Those from 'traditional' backgrounds within this group, closer to the ethnic community, tend to come from larger families.

The differences that exist for this group with respect to the English can be interpreted in the same light. Most of the larger differences are in factors which indicate traditional ethnic backgrounds (both parents foreign born, Protestant, age), the

smaller indicators of non-traditional (Quebec born). The lower ethnic constant term is also less of a puzzle. Those from 'traditional' backgrounds appear to respond to conditions in such a way that they offset the lower constant. Those from non-traditional backgrounds, with fewer factors adding siblings, will, with the lower constant have closer to a normal family size. The difference in the constant terms then can be interpreted as a statistical artifact that accommodates the differences within the group that show up in the dummy variables.

The same seems true, though to a lesser extent, for the French and Germans. The largest deviation from the English for the latter is in the effect of foreign born parents, raising family size, while non-traditional Catholics come from smaller families. For the French, Quebec roots (or for the Scots, Maritime roots) also indicate greater parental fertility.

The other variables where differences exist are also of some interest from this point of view. In several cases parental education variables are weaker for the non-British groups, indicating that higher levels do not reduce family size as much. On the other hand, father's occupational status and mother's work tend to decrease family size more strongly for them. While other explanations are possible, it could be that breaking away from their background (here by becoming successful or assigning unusual marital roles) reduces family size dramatically. Parental education, however, does not have such an effect, perhaps because the system did not allow them to fully utilize their education.

Or it may be that their education was not as productive an investment, lacking in complementary home inputs as is suspected here for their children.

(b) Schooling (Table IV-6)

At the overall level, the determination of completed education varies much less and more randomly than was the case with parental fertility. Some differences open up between the 'english-speaking' groups: the Scots are significantly different from the English at the 5 percent level, the Irish also at the fringe of significance at that level. The French again are significantly different from all three of these at the 1 percent level. The Germans here fail to differ significantly from any group, however, and the Ukrainian/Polish/Norwegian group differs from the Scots and French at the 1 percent level, but not from others.

Referring to the individual coefficients presented in Table IV- 6, it is clear that what differences do arise in the overall determination of education are the product of differences in degree, not in the sign of variables. Only one significant coefficient is reversed in sign. Nor are there major deviations from the list of more important variables determined in the pooled estimates of Table IV-4. In almost all cases, the number of siblings, father's occupation, mother's education and age continue to be central determinants.

This greater consistency of the model, however, does not

prevent the generation of systematic differences in coefficients that again appear to follow the pattern found in the previous equation - indicating less education for those 'ethnics' with characteristics identified with traditional backgrounds, and more education for the non-traditional. The time trend, or age variable, is the most obvious of these, indicating for example that a 40 year old from the Ukrainian/Polish/Norwegian group would receive 1.3 years less education than an otherwise similar individual whose background was English. The French (.8 of a year) and Germans (1.1 years) have similar differences.

Other effects are more subtle and less general from group to group, as is to be expected as 'traditions' vary in the same way. Ukrainians/Poles/Norwegians whose parents were separated by age 16 receive significantly more education (essentially a year) than do the English. In fact this shift reverses the sign on this variable but not to the point where it attains significance. Those whose language first spoken was other than English or French on the other hand, receive 6.7 years less education than the English. Germans receive 7.3 years less due to this factor. Germans from small-town or rural backgrounds, where immigrants would traditionally have settled, receive from a year to 1.4 years less education than the English of similar origins, while those who break from tradition in being Roman Catholic receive .9 of a year more. The French from a traditional rural background achieve 1.2 years less education than the rural English, and less education at lower levels of father's occupational status as well.

Similar effects do not exist (although coefficients do vary) for the Irish and Scottish.

Finally, it should not be forgotten that the impact of the differential effect of traditional or non-traditional backgrounds on parental fertility for the 'ethnic' groups will be felt here through the siblings variable. For example, the difference in family size noted for the Ukrainian/Polish/Norwegian group was as high as 3.9 siblings in the case of a foreign-born mother, Roman Catholic religion and ten years of age difference. This would imply here a further 1.1 years less education. For the French and Germans, these effects are smaller, but tend in the same direction.

(c) Discussion

An important point to note is that the sociological literature is useful here in identifying which individuals act differently because of closer ties to their ethnic roots, as opposed to indicating why and how they will behave differently. The behaviour we observe is arguably inconsistent with the theory in the sense that the quantity side of parental fertility decisions seems to offer more evidence of these effects than educational investment. The sociological approach as outlined above, however, appears to indicate that the effect of ethnic community will be felt in the latter. The causality here, admittedly, is ambiguous³⁰. A lack of educational aspirations by these groups may have induced a substitution of quantity for

quality, or ethnic factors determining quantity and quality may, as Chiswick's model suggests, influence education through fertility choice. It should be noted again, however, that the evidence on rates of return strongly indicates that these latter demand-side effects on education are at work rather than the supply-side effects implied. A more interesting possibility, entirely consistent with Chiswick's model, would be to specify the determination of parental quality/quantity decisions more completely. There is a large literature beyond the relatively narrow confines of the mainstream Becker et al. version of fertility choice with its emphasis on price and resource constraints.³¹ This literature emphasizes the importance of information and uncertainty and the roles that reference points such as the family of origin and the community can play in dealing with these factors.³² Here the outcomes for those from traditional backgrounds could be interpreted along economic lines as being determined as they are in large part because their parents were making decisions based on what they were familiar with - the best information they had. This information set would of course be different from the information available to those who had broken out of the ethnic communities and to the rest of us. If we 'control' for this difference in information by interpreting the different coefficients on certain variables as informational constraints on certain ethnic groups, the Chiswick model is even more attractive. To the extent that the differences in coefficient values that stem from these constraints are

predictable, the 'unexplained' content of the model seen in Tables IV-5 and IV-6 is diminished considerably. This approach does not violate the wish to avoid ad hoc explanations. The differences involved are relatively systematic and predictable.³³

SUMMARY AND CONCLUSIONS

The estimates presented in this paper provide strong support for the parental quality/quantity model suggested by Chiswick. The pooled data are capable of explaining over half the range of overall group differences in earnings, education and parental fertility and in some individual group cases, deviations from the reference group are almost entirely explained. The separate regressions presented in Tables IV-5 and IV-6 again indicate that for some groups (English, Irish, Scottish) the model as a whole works fairly uniformly. Other groups (particularly Ukrainians, Poles and Norwegians) are not well accounted for in either the pooled or separate estimates. A good part of this pattern can be explained, however, by noting that differences in their behaviour could result from the informational constraints implied by ties to the traditional ethnic community.

In fact, given that the major problem we have identified with Chiswick's model is the ethnic community influence, it is interesting to speculate on the success of the model if similar data were available for the supposed "melting-pot" of the United States.

Reference has been made to the sociological literature and ties to ethnic community have been found to present a reasonable explanation for significant variations in observed behaviour. It should be emphasized, however, that this literature has been more useful in categorizing these groups and pointing to the existence of these communities than in explaining their effects. The implications of the theory are contradicted by the evidence found in earnings functions on returns to education. Moreover, evidence on the mechanics of the determination of investments in education as presented in these Tables is much more consistent with the quantity/quality choice framework of Chiswick, extended to allow for information constraints, than the role of aspirations advanced by sociologists.

A final question is what this implies for the perpetuation of ethnic group differences in Canada. In response it seems reasonable to suggest that the potential for some degree of perpetuation is there. In finding that the model presents a reasonable explanation for both differences in education and rates of return, we have found that to some extent the differences involved are inherited and perpetuated. Whether they will be passed on is a different question. Certainly some education differential exists which would impact on the present generation's quality/quantity fertility decisions, but it is not clear how much of the other factors involved will have been retained. Location, language, and even religion can and do vary from generation to generation. Equally important, if information is part of the

process, the role of the community as the source of information is no doubt being reduced in any case as transportation and communications improvements bring outside information into communities regardless of these characteristics. The fact that many individuals escape from the influence of traditional ethnic communities with the passage of time indicates that some change is inevitable. Certainly there would be an interest in examining comparable data of more recent origin for evidence of such change.

Table IV-1. Preliminary Estimates and Means

	<u>Years of Education</u>	<u>Rate of Return to Education</u>	<u>Number of Siblings</u>
Jewish	13.78	6.5%	2.778
Scottish	12.17	4.7%	3.772
Norwegian	11.88	5.3%	3.871
Irish	11.69	3.4%	4.343
Ukrainian	11.23	3.5%	4.468
German	11.21	4.3%	4.473
Polish	10.97	2.2%	4.539
French	10.23	3.7%	6.419

* Estimates from preliminary earnings functions similar to those in Table IV-4, but omitting family background variables and from somewhat larger samples.

Years of Education and Number of Siblings from the same data sample.

Table IV-2. Variable Definitions

LNFEARN	Natural log of income from employment, 1972**
EDUC	Number of years in school
PARTFERT	Parental completed fertility (Number of siblings + 1)
DG*	University degree
EXP	Number of years worked
EXP ²	Number of years worked squared
LNWKS	Natural log of weeks worked, 1972**
APR*	Apprenticeship or training program completed
PART*	Employed Part-time
SELF*	Self-employed
BREAK*	Did not work for a period of at least one year since first job
NPERUN	Number of periods 3 months or longer of unemployment since first job**

LANGUAGE ABILITY*

ENG	Unilingual English (Reference Group)
FREN	Unilingual French
BILN	Bilingual

LANGUAGE FIRST SPOKEN*

LPSENG	Language first spoken English (Reference Group)
LPSFR	Language first spoken French
LPSOTH	Other language first spoken
AGE	Age in 1972
NCHILD	Number of children

BRST Number of siblings

BRO Number of brothers

MARITAL STATUS*

MAR Married, spouse present (Reference Group)

NOTM Never married

PREVM Previously married (Divorced, Widowed or Separated)

RELIGION*

CATH Roman Catholic

PROT A Anglican (Reference Group)

PROT B United Church, Presbyterian, Dutch Reform or Lutheran

OTHREL Greek Orthodox, Ukrainian Catholic, Other Protestant, Other (including Jewish)

NOREL No Religion

FAED Father's years of education**

FADG* Father obtained university degree

FAOC Blisshen index of father's occupational status

FAFOR* Father foreign born, Mother Canadian

MOED Mother's years of education**

MDG* Mother obtained university degree

MOTHER'S WORK HISTORY*

MWK1 Mother worked, but for less than one year (out of time individual was school aged)

MWK2 Mother worked 1 to 5 years

MWK3	Mother worked 6 years or more
MWK4	Mother never worked (Reference Group)
MOFOR*	Mother foreign born, Father Canadian
BPFOR*	Both Parents foreign born
NOIL1*	Individual did not live with both parents at age 16

URBAN/RURAL* Place of Residence 1972

METRO	Large Urban Centre (Reference Group)
CITY	Medium Urban Area
TOWN	Small Urban Area
RURF	Rural

URBAN/RURAL 16* Place of Residence at age 16

METRO 16	Large Urban Centre (Reference Group)
CITY 16	Medium Urban Area
TOWN 16	Small Urban Area
RURF 16	Rural

PROVINCE/REGION* Location 1972

ATL	Atlantic Provinces
QUE	Quebec
ONT	Ontario (Reference Group)
PRA	Prairie Provinces
BC	British Columbia

PROVINCE/REGION 16* Location at age 16

ATL 16	Atlantic Provinces
QUE 16	Quebec
ONT 16	Ontario (Reference Group)

PRA 16 Prairie Provinces

BC 16 British Columbia

PROVINCE/REGION OF BIRTH*

ATLB Atlantic Provinces

QUEB Quebec

ONTB Ontario (Reference Group)

PRAB Prairie Provinces

BCB British Columbia

ETHNIC BACKGROUND*

JEW Jewish

FRE French

GER German

IRE Irish

ENG English (Reference Group)

NOR Norwegian

POL Polish

SCO Scottish

UKR Ukrainian

* indicates dummy variable, equal to one if
 criteria satisfied, zero otherwise.

** values coded from class data.

Table IV-3. Variable Means*

	<u>All</u>	<u>English</u>	<u>Scot.</u>	<u>Irish</u>	<u>French</u>	<u>German</u>	<u>Ukrainian Polish & Norwegian (UPN)</u>
LINEARN	8.870	8.895	8.987	8.895	8.768	8.864	8.928
(\$)	7115.28	7295.41	7998.43	7295.41	6425.31	7072.72	7540.17
EDUC	11.302	11.622	12.359	11.768	10.278	11.408	11.458
PARFERT	5.816	4.965	4.758	5.358	7.499	5.492	5.274
IG (%)	13.0	13.7	18.0	14.2	9.2	12.4	13.8
EXP	19.432	19.609	19.770	20.179	19.472	17.511	19.016
INWKS	3.798	3.791	3.824	3.813	3.782	3.824	3.805
(WEEKS)	44.6	44.3	45.8	45.3	43.9	45.8	44.93
APR (%)	24.5	25.1	27.3	24.4	23.9	23.4	23.0
PART (%)	3.8	2.7	3.4	2.2	6.1	3.6	2.4
SELF (%)	15.0	14.8	12.9	15.9	12.8	23.2	19.2
BREAK (%)	11.9	12.4	10.4	13.7	12.4	8.1	11.6
NPERUN	1.398	1.430	1.009	1.374	1.617	1.191	1.270
FREN (%)	11.6	0.2	0.3	1.2	36.7	-	-
BILN (%)	22.4	7.2	8.8	11.2	54.8	5.0	4.1
LFSFR (%)	29.3	1.0	1.3	5.0	90.7	1.7	0.5
LPSOTH (%)	5.4	0.1	0.3	-	-	27.2	50.9
AGE	38.885	39.007	39.601	39.719	38.641	37.141	38.759
BRST	4.816	3.965	3.758	4.358	6.499	4.492	4.274
BRO	2.449	2.019	1.946	2.194	3.296	2.267	2.195
NCHILD	2.307	2.214	2.184	2.411	2.473	2.260	2.122
NOTM (%)	11.1	9.8	9.9	9.5	12.5	11.2	14.9
PREVM (%)	2.9	3.2	2.1	3.5	2.6	2.1	3.5
CATH (%)	40.5	11.6	14.1	34.6	91.8	24.1	19.8
PROTB (%)	28.8	39.4	53.5	37.6	3.5	40.3	28.2
OTHREL (%)	11.9	15.5	10.8	5.9	1.6	20.3	36.9
NOREL (%)	6.7	8.5	11.4	8.2	1.8	7.9	8.7
FAED	7.279	7.995	8.896	8.389	5.940	6.976	5.515
FADG (%)	2.8	3.7	4.5	3.5	1.4	2.1	0.8
FAOC	34.295	35.708	38.021	35.299	32.491	31.461	29.228
FAFOR (%)	7.9	9.6	9.8	5.5	1.5	14.3	22.2
MOED	7.688	8.351	9.202	8.883	6.478	7.277	5.824
MODG (%)	1.2	1.9	1.5	1.5	0.3	0.7	0.8
MWK1 (%)	7.1	8.8	9.8	7.2	3.5	8.1	9.5
MWK2 (%)	3.2	3.6	3.3	3.8	2.1	4.5	3.0
MWK3 (%)	5.1	4.7	7.1	6.5	3.7	3.8	9.2
MOFOR (%)	5.5	6.9	8.5	7.7	2.6	5.3	3.5
BPFOR (%)	11.7	12.8	11.4	7.8	0.9	23.4	48.0
NOTLI (%)	11.0	11.5	12.9	13.4	9.0	10.0	12.2
CITY (%)	16.4	16.8	16.2	17.4	15.8	15.3	17.6
TOWN (%)	15.9	12.4	16.3	13.2	18.8	17.9	22.4
RURF (%)	34.7	37.3	31.0	34.6	35.6	38.4	24.1

	<u>All</u>	<u>English</u>	<u>Scottish</u>	<u>Irish</u>	<u>French</u>	<u>German</u>	<u>Ukrainian Polish & Norwegian (UPN)</u>
CITY 16 (%)	26.5	26.0	27.8	27.1	28.6	21.7	22.2
TOWN 16 (%)	29.0	29.6	24.4	27.4	34.2	24.3	19.5
RURF 16 (%)	22.4	21.4	20.9	23.7	16.7	38.7	38.5
ATL (%)	21.8	34.3	25.4	27.0	12.8	11.2	1.1
QUE (%)	24.9	3.8	4.5	7.7	70.8	1.7	1.4
PRA (%)	20.6	18.0	21.1	24.5	5.1	53.2	63.2
BC (%)	9.3	11.3	15.7	10.9	2.6	11.7	15.4
ATL 16 (%)	22.6	35.6	27.2	28.4	12.9	10.5	0.8
QUE 16 (%)	25.3	4.4	4.0	8.0	71.1	2.4	2.2
PRA 16 (%)	23.1	20.2	23.8	27.1	5.8	58.0	73.7
BC 16 (%)	6.2	7.9	11.1	8.2	1.3	6.7	9.2
ATLB (%)	16.2	19.5	26.6	20.6	12.4	9.3	0.5
QUEB (%)	25.5	4.5	4.8	7.7	71.4	2.4	3.0
PRAB (%)	25.0	22.3	25.0	29.1	6.6	62.1	78.3
BCB (%)	4.5	6.1	9.4	5.2	1.0	4.1	4.9
n	5780	1882	674	599	1788	419	369

* Means for Jewish, Ukrainian, Norwegian and Polish Samples appear in Appendix Table IV-A-1.

Table IV-4. Equation Estimates, Pooled Data

	<u>Parental Fertility</u> (OLS)	<u>Completed Education</u> (OLS)	<u>Earnings</u> (2SLS)
FAFD	-0.0667* (4.641)	0.108* (7.501)	-0.00121 (0.456)
FAOC	-0.0301* (8.683)	0.0595* (16.233)	0.00168** (2.268)
FADG	0.622** (2.329)	0.416 (1.563)	-0.733*** (1.667)
FAFOR	-0.252*** (1.660)	0.0914 (0.602)	0.0106 (0.418)
MOED	-0.124* (8.572)	0.177* (12.197)	-
MODG	0.206 (0.558)	-0.657*** (1.786)	-
MWK1	-0.798* (5.223)	-0.103 (0.675)	-0.0521** (2.053)
MWK2	-1.082* (4.924)	-0.0595 (0.270)	0.0147 (0.402)
MWK3	-1.288* (7.290)	0.107 (0.598)	0.0372 (1.266)
MOFOR	-0.278 (1.611)	0.0451 (0.262)	-0.0114 (0.398)
BPFOR	-0.164 (1.162)	0.506* (3.525)	0.00212 (0.091)
AGE	0.0201* (5.715)	-0.0705* (19.981)	-
BRST	-	-0.178* (7.772)	-
BRO	-	0.0546 (1.490)	-
NOTLI	-	-0.486* (3.934)	-
EDUC	-	-	0.0396* (4.801)

	<u>Parental Fertility</u> (OLS)	<u>Completed Education</u> (OLS)	<u>Earnings</u> (2SLS)
EXP	-	-	0.0292* (13.801)
EXP ²	-	-	-0.000571* (13.895)
DG	-	-	0.409* (18.493)
LNWKS	-	-	0.660* (32.763)
PART	-	-	-0.313* (9.333)
SELF	-	-	-0.262* (13.841)
BREAK	-	-	-0.0878* (4.274)
NPERUN	-	-	-0.00859* (4.594)
APR	-	-	0.0875* (5.833)
NOTM	-	-	-0.306* (13.741)
PREVM	-	-	-0.184* (4.824)
NCHILD	-	-	0.0157* (4.146)
LFSFR	-	0.190 (0.848)	-
LFSOTH	-	0.217 (0.935)	-
FREN	-	-	-0.138* (3.661)
BILN	-	-	-0.0156 (0.580)

	<u>Parental Fertility</u> (OLS)	<u>Completed Education</u> (OLS)	<u>Earnings</u> (2SLS)
ATLB	0.530* (4.355)	-	-
QUEB	0.514* (3.679)	-	-
PRAB	0.0914 (0.787)	-	-
BCB	-0.373*** (1.870)	-	-
ATL 16	-	-0.384* (3.138)	-
QUE 16	-	-0.754* (4.951)	-
PRA 16	-	-0.0422 (0.343)	-
BC 16	-	-0.451** (2.564)	-
ATL	-	-	-0.158* (7.530)
QUE	-	-	-0.0656* (2.405)
PRA	-	-	-0.146* (7.078)
BC	-	-	0.0678** (2.707)
CITY 16	-	-0.0962 (0.859)	-
TOWN 16	-	-0.850* (7.075)	-
RURF 16	-	-0.173 (1.338)	-
CITY	-	-	-0.0162 (0.804)
TOWN	-	-	-0.0866* (4.244)

	<u>Parental Fertility</u> (OLS)	<u>Completed Education</u> (OLS)	<u>Earnings</u> (2SLS)
RURF	-	-	-0.211* (10.039)
CATH	1.134* (7.409)	0.0978 (0.629)	-
PROT B	-0.0509 (0.383)	0.0153 (0.116)	-
OTHREL	0.332** (2.032)	0.0957 (0.588)	-
NOREL	0.0895 (0.479)	0.579* (3.106)	-
JEW	-1.022** (2.290)	1.448* (3.251)	0.217* (2.950)
FRE	0.782* (5.101)	0.0324 (0.158)	0.0197 (0.724)
GER	0.130 (0.794)	0.0289 (0.168)	0.0170 (0.631)
IRE	0.195 (1.394)	0.147 (1.057)	-0.0250 (1.100)
NOR	0.224 (0.669)	0.00540 (0.016)	0.0509 (0.918)
POL	-0.261 (0.722)	-0.146 (0.392)	0.142** (2.390)
SCO	0.00909 (0.069)	0.284** (2.164)	-0.00789 (0.361)
UKR	-0.541** (2.329)	0.829* (3.164)	-0.00739 (0.197)
Constant	6.733* (27.751)	10.937* (38.852)	5.790 (49.563)
$\bar{R}_2$	.2497	.3922	.4821
S.E.	2.8834	2.8637	.4726
n	5769	5769	5769

Dependent variables are PARFERT, EDUC and LNEARN, respectively.

t-statistics in brackets; * significant at 1% level; ** at 5%

*** at 10%.

Table IV-5. Parental Fertility Functions, by Ethnic Group

	<u>English</u>	<u>Scottish</u>	<u>Irish</u>	<u>French</u>	<u>German</u>	<u>UKR/POL/ NOR</u>
FAFD	-0.0694* (2.960)	-0.0391 (1.048)	-0.110** (2.516)	-0.0677** (2.208)	-0.0882 (1.630)	0.0651 (1.342)
FAOC	-0.0163* (3.090)	-0.0293* (3.433)	-0.0154 (1.494)	-0.0478* (6.372)	-0.0424* (2.976)	-0.0536* (3.079)
FADG	0.523 (1.381)	0.578 (0.965)	1.107 (1.479)	0.324 (0.438)	0.394 (0.348)	1.882 (1.114)
FAFOR	-0.163 (0.734)	-0.485 (1.339)	-0.131 (0.253)	-0.00795 (0.012)	-0.318 (0.709)	0.454 (1.107)
MOFD	-0.163* (6.861)	-0.165* (4.188)	-0.0817*** (1.938)	-0.0755** (2.537)	-0.0381 (0.693)	-0.170* (3.411)
MODG	0.451 (0.935)	0.179 (0.205)	0.219 (0.222)	-0.630 (0.462)	-0.448 (0.253)	0.0585 (0.035)
MWK1	-0.613* (2.717)	-0.183 (0.512)	-1.140* (2.495)	-1.267* (2.966)	-1.664* (3.140)	0.0509 (1.051)
MWK2	-0.872* (2.593)	-0.774 (1.323)	-1.043*** (1.728)	-1.931* (3.548)	-0.916 (1.297)	-0.414 (0.501)
MWK3	-1.262* (4.245)	-0.823* (2.006)	-1.343* (2.839)	-1.318* (3.130)	-2.319* (3.040)	-1.116** (2.270)
MOFOR	-0.215 (0.851)	-0.414 (1.101)	-0.149 (0.334)	-0.934** (1.881)	0.354 (0.543)	1.288*** (1.656)
BPPOR	-0.560* (2.687)	-0.621*** (1.797)	0.0315 (0.070)	-0.232 (0.277)	1.141* (2.718)	0.529 (1.253)
ATLB	0.377** (2.231)	1.338* (4.807)	0.398 (1.242)	0.335 (0.957)	0.350 (0.628)	2.311 (1.220)
QUEB	-0.0654 (0.212)	0.636 (1.260)	0.419 (0.909)	0.739** (2.560)	-1.277 (1.296)	-2.029** (2.272)
PRAB	0.0750 (0.441)	0.301 (1.111)	-0.368 (1.223)	0.285 (0.694)	0.148 (0.370)	0.295 (0.671)
BCB	-0.707** (2.520)	-0.0315 (0.082)	-0.298 (0.543)	-0.381 (0.448)	0.589 (0.724)	0.128 (0.171)

Table IV-5. Parental Fertility Functions, by Ethnic Group (Cont'd.)

	<u>English</u>	<u>Scottish</u>	<u>Irish</u>	<u>French</u>	<u>German</u>	<u>UKR/POL/ NOR</u>
CATH	1.183 (5.332)	1.196* (2.818)	1.599* (4.258)	0.295 (0.412)	0.0653 (0.107)	2.134* (3.300)
PROTB	-0.0631 (0.395)	0.135 (0.388)	-0.202 (0.546)	-0.110 (0.135)	-0.948*** (1.651)	1.408** (2.303)
OTHREL	0.337*** (1.665)	0.787*** (1.757)	0.148 (0.259)	-0.247 (0.264)	-0.601 (0.985)	0.920 (1.513)
NOREL	-0.104 (0.416)	0.0565 (0.126)	1.126** (2.200)	0.0445 (0.050)	-1.095 (1.501)	0.531 (0.742)
AGE	0.0191* (3.329)	0.00472 (0.506)	0.00501 (0.473)	0.0315* (4.549)	0.0119 (0.833)	0.0475* (2.832)
Constant	6.732* (19.386)	6.983* (10.402)	6.960* (8.826)	8.036* (9.731)	7.753* (7.725)	3.985* (3.544)
$\overline{R^2}$	.1841	.1915	.1627	.1156	.1758	.2389
S.E.	2.6581	2.6217	2.7802	3.2487	2.8240	2.5939
n	1880	668	598	1788	419	369

Dependent variable is PARFERT.

t-statistics in brackets; * significant at 1% level; ** at 5%;
*** at 10%.

Table IV-6. Schooling Functions, by Ethnic Group

	<u>English</u>	<u>Scottish</u>	<u>Irish</u>	<u>French</u>	<u>German</u>	<u>UKR/POL/ NOR</u>
BRSI	-0.228* (5.214)	-0.157** (2.192)	-0.252* (3.649)	-0.0935** (2.423)	-0.152** (2.137)	-0.287* (2.836)
BRO	0.0810 (1.160)	0.0878 (0.756)	0.0842 (0.763)	0.00791 (0.128)	-0.0218 (0.195)	0.176 (1.203)
FAED	0.125* (4.944)	0.0585 (1.529)	0.0147 (0.365)	0.139* (4.826)	0.0528 (1.182)	0.0387 (0.715)
FADG	1.144* (2.816)	-0.0330 (0.054)	0.760 (1.103)	0.651 (0.937)	0.254 (0.271)	-2.749 (1.452)
FAOC	0.0545* (9.021)	0.0533* (5.874)	0.0583* (5.843)	0.0741* (10.013)	0.0402* (2.870)	0.0570* (2.778)
FAFOR	0.0975 (0.403)	-0.501 (1.356)	-0.270 (0.573)	0.866 (1.410)	-0.00785 (0.021)	0.854*** (1.843)
MOED	0.138* (5.372)	0.181* (4.443)	0.265* (6.836)	0.203* (7.197)	0.182* (3.927)	0.0936 (1.632)
MODG	-0.521 (1.008)	-1.824** (2.043)	-0.832 (0.920)	-1.719 (1.343)	-0.0872 (0.060)	0.881 (0.474)
MWK1	-0.199 (0.817)	-0.121 (0.329)	-0.0761 (0.181)	0.355 (0.880)	-0.307 (.667)	-0.0230 (0.040)
MWK2	0.0745 (0.205)	0.256 (0.423)	-0.842 (1.509)	0.178 (0.346)	0.858 (1.451)	-1.266 (1.347)
MWK3	0.397 (1.222)	-0.262 (0.605)	0.964** (2.185)	-0.189 (0.469)	-0.180 (0.282)	-0.366 (0.652)
MOFOR	0.199 (0.730)	-0.422 (1.091)	-0.313 (0.770)	0.761 (1.628)	-0.571 (1.049)	-0.559 (0.638)
BPFOR	0.271 (1.177)	0.199 (0.558)	0.407 (0.985)	0.0536 (0.068)	0.855** (2.419)	0.736 (1.558)
NOTLI	-.567* (2.683)	-1.170* (3.511)	-0.685** (2.162)	-0.271 (1.053)	-0.687*** (1.729)	0.689 (1.407)
AGE	-.0629* (10.096)	-0.0457* (4.744)	-0.0581* (6.023)	-0.0862* (13.061)	-0.0943* (7.837)	-0.110* (5.728)
LFSFR	-0.175 (0.254)	-0.522 (0.495)	-0.907 (1.591)	0.503 (1.538)	-0.670 (0.510)	-2.886 (1.320)

	<u>English</u>	<u>Scot.</u>	<u>Irish</u>	<u>French</u>	<u>German</u>	<u>UKR/POL/ NOR</u>
LESOTH	7.322 (2.559)	0.250 (0.130)	-	-	-0.0694 (0.219)	0.549 (1.439)
ATL16	-0.348*** (1.869)	-0.804* (2.659)	-0.549*** (1.776)	-0.177 (0.549)	-0.115 (0.252)	-1.875 (1.070)
QUE16	-0.824** (2.376)	-0.532 (0.869)	-0.314 (0.661)	-0.742* (2.687)	0.957 (0.846)	0.0592 (0.051)
PRA16	0.0315 (0.158)	-0.268 (-0.946)	-0.165 (0.565)	0.177 (0.446)	-0.222 (0.657)	-0.0277 (0.054)
BC16	-0.304 (1.118)	-0.616*** (1.653)	-0.573 (1.368)	-0.762 (1.084)	0.0685 (0.121)	-0.207 (0.302)
CITY16	0.0856 (0.437)	-0.228 (0.774)	0.164 (0.512)	-0.349 (1.629)	-1.056* (2.599)	-0.284 (0.569)
TOWN16	-0.658* (3.104)	-0.889* (2.717)	-1.183* (3.487)	-0.865* (3.927)	-1.730* (3.907)	-1.411* (2.596)
RURF16	0.321 (1.426)	-0.121 (0.342)	-0.114 (0.330)	-0.947* (3.635)	-1.089** (2.517)	0.0304 (0.059)
CATH	-0.119 (0.489)	-0.570 (1.277)	0.530 (1.496)	-0.0305 (0.051)	0.537 (1.056)	-0.147 (0.199)
PROTB	0.0808 (0.466)	-0.618*** (1.740)	0.120 (0.358)	-0.644 (0.845)	0.210 (0.438)	0.267 (0.389)
OTHREL	0.301 (1.393)	-1.206* (2.624)	0.262 (0.504)	-0.0696 (0.079)	0.335 (0.647)	0.0706 (0.101)
NOREL	0.881* (3.265)	0.563 (1.220)	0.341 (0.726)	0.862 (1.010)	-0.0621 (0.099)	-0.2... (0.2...)
Constant	10.824* (23.992)	11.712* (14.837)	10.837* (13.420)	10.306* (12.390)	13.512* (12.048)	13.691* (10.323)
$\bar{R}^2$	.3894	.3268	.4459	.3762	.4355	.2506
S.E.	2.8498	2.6686	2.5302	3.0451	2.3205	2.9738
n	1880	669	508	1788	419	369

Dependent variable is EDUC.

t-statistics in brackets; * significant at 1%;

** at 5%; *** at 10%.

Figure IV-1. Demand and Supply Schedules
for Investment in Education

Based on Becker and Chiswick (1966)

FOOTNOTES

1. Chiswick (1986) has argued this point quite thoroughly, the evidence coming from recent extensions of the study of earnings differentials beyond the traditional black/white, male/female focus, for example work on Hispanic and Asian minorities in the United States (Carliner (1976), McManus et al (1983) and Chiswick (1983b)).
2. The United States is frequently described as a 'melting pot', while Canada remains a 'community of communities'. These differences may, of course, have been exaggerated. Academic discussion of these differences in Canada centres around the 'Vertical Mosaic' of John Porter (1965).
3. Ben-Porath (1967) has presented some evidence on the tendency of returns to decline beyond some point.
4. Chiswick (1986), pg. 11.
5. Chiswick (1986), pg. 11.
6. Chiswick (1986) Table 1, page 4.
7. Returns to a degree represent a second component of the returns to education in these regressions. While not as uniformly ranked, in all cases these effects are small enough to leave the impression presented in Table IV-1 unchanged.
8. Charter groups include the English, Irish, Scottish and French, dominant at the founding of the country. Other groups tended to arrive in later waves of immigration - northern Europeans, south and eastern Europeans, and more recently non-Europeans.
9. For those originating in the United Kingdom, entry to Canada was on a preferred basis through much of the period in question. Others tended to be allowed to enter and directed to certain areas as economic conditions warranted - Eastern European peasants for example when less desirable lands in the prairies needed to be filled out, and more recently southern European tradespeople to accommodate the post-war building boom in urban Canada.
10. Darroch (1979).

11. One possibility that has not been pursued in the literature is that suggested by Carr and Landa (1983). They view ethnic or religious identity as a type of information mechanism, used essentially as a 'Club' membership. This might help explain how certain groups that get singled out as different may in fact be able to 'discriminate' in favour of themselves.

12. The failure of discrimination models to explain the facts of the Jewish case has been the focus of much of the economics of religion, particularly Chiswick (1983a), Ayal and Chiswick (1983) and Tomes (1983). Chiswick (1983b) presents similar arguments and evidence for Asian groups.

13. Chiswick (1986) presents less directly linked but similarly persuasive figures for the United States.

14. The backbone of the fertility choice literature would have to be the series of papers presented in the supplement to volume 81 no. 2 of the Journal of Political Economy - including Becker and Lewis (1973) and DeTray (1973). Examples of later work would include Becker and Tomes (1976) and Tomes (1981). Becker (1981) would, of course, present a detailed summary of the concept. On the determination of educational investments, Becker (1981) again provides a definitive statement, but one could also mention examples from the past decade or so such as Morgenstern (1973), Leibowitz (1974a) (1977), Parsons (1975), Griliches (1976) and Lindert (1977). These provide the background for the following discussion.

15. Such differences, primarily in the degree of specialization or division of labour, are discussed in another of these papers.

16. This is central to what Chiswick (1986) is trying to establish, that "... as a consequence of initial exogenous price differences among racial and ethnic groups, a process is set into motion in which group differences in fertility, skill formation, rates of return and earnings are created and are transmitted from generation to generation" (p. 20).

17. The data base used here, the Canadian National Mobility Study (1973) presents a considerable range of direct information on parental characteristics. Chiswick has had to infer these by assuming data on individuals 30 years earlier will approximate the characteristics of parents.

Use of this data base obliges me to acknowledge the principal researchers - M. Boyd, H.A. McRoberts and J. Porter of Carleton University, F. Jones and P.C. Pineo of McMaster University and J. Goyder of the University of Waterloo as well as the Canada Council for its funding and Statistics Canada for the data collection.

18. Other criteria are positive weeks worked and earnings in 1972, ages 22 to 64 inclusive. The sample has also been edited to exclude those with no response to the relevant variables.

19. Sample sizes noted in Tables IV-3 and IV-A-1. While that for Jews is particularly small, previous work with this group (Meng and Sentance (1984)) demonstrated sufficient consistency with results generated with larger samples (Tomes (1983)) to warrant its consideration.

20. Scots differ from the Irish and English at the 5 percent level in the education function, while these two differ at 5 percent in the earnings function. The French differ, generally at the 1 percent level from these three in both the fertility and education functions, and from the English and Irish at 5 percent in earnings. German differences from the French are only at 5 percent in the earnings function, while they differ from the three British groups at varying levels in fertility and earnings. The Ukrainian/Pole/Norwegian group differs from all (generally at 1 percent) in both earnings and fertility, and from Scots and the French in education.

21. Johnston (1972) pg. 369.

22. That is, the residuals from the fertility equation when included in the education function were insignificant (below the 10% level). Those for education in the earnings function were significant. These results do not appear to be greatly affected by the inclusion of more or fewer of the exogenous variables in the model.

23. A variable representing the number of brothers (BRO) has also been introduced given the possibility that parental inputs (and the sharing of parental inputs implied by siblings) might differ depending on the sibling's sex.

24. Tomes (1984) does not include the university degree variable but does find a discontinuity in rates of return to education at the end of high school, an effect that university degrees could be capturing here.

25. The 2SLS procedure tends to bias the t values generated upwards somewhat, though the coefficient estimates should be consistent. In what follows it is important to note that the dummy variables in the earnings function have been adjusted further for bias resulting from the use of the semi-logarithmic functional form using the procedure outlined by Kennedy (1981).

26. Father's characteristics may, of course, be expected to present some ambiguities. Higher education shifts the relative prices of quality and quantity, but also implies an income effect which, if child quantity is a normal good (as Tomes (1981) suggests) would work in the opposite direction. In any case, none of the individual group regressions presented later (Table IV-5) match this.

27. These factors together imply that a further years difference between Jews and the French are controlled for. Location also accounts for part of the difference.

28. Differences in specific coefficients across groups are tested for significance by the use of interaction terms in pooled regressions.

29. Some initial testing was performed to reduce the number of variables interacted to those that seemed likely to present significant differences. The same procedure was followed for the education function.

30. In models dealing with parental quality/quantity decisions this is in fact often modelled as a simultaneously determined pair of outcomes (Becker (1981), Tomes (1981)).

31. Becker (1981) presents a definitive statement. Again, the 1973 supplement to the *JPE* includes several papers which have formed the foundation for this approach, including Becker and Lewis, Willis, DeTray, and Michael.

32. Richard Easterlin (1978) (et al (1980)) is by far the most prominent name here, developing what has become known as the 'Easterlin Hypothesis'. Peter Lindert (1977) (1978) has also presented work along these lines.

33. In essence this is what is presently done for factors such as religion, where through knowledge of the institutional background involved we can predict some implications for fertility choice.

Table IV-A-I. Variable Means

	<u>Jews</u>	<u>Ukrainian</u>	<u>Polish</u>	<u>Norwegian</u>
LNEARN	9.389	8.873	9.023	8.992
(\$)	11,956.14	7136.66	8291.61	8038.52
EDUC	14.128	11.442	10.873	12.073
PARFERT	3.783	5.290	5.676	4.877
DG (%)	42.6	15.7	9.9	15.9
EXP	16.851	19.631	18.718	17.646
LNWKS	3.826	3.805	3.811	3.801
(WEEKS)	45.9	44.9	45.2	44.7
APR (%)	10.6	20.3	22.5	30.5
PART (%)	-	2.8	2.8	1.2
SELF (%)	23.4	20.3	12.7	22.0
BREAK (%)	6.4	13.8	8.5	8.5
NPERUN	0.489	1.138	1.408	1.500
FERN (%)	-	-	-	-
BILN (%)	38.3	3.2	7.0	3.7
LFSFR (%)	-	0.5	1.4	-
LFSOTH (%)	8.7	64.5	50.7	14.8
AGE	38.978	39.438	38.197	37.432
BRSI	2.783	4.290	4.676	3.877
BRO	1.478	2.129	2.535	2.074
NCHILD	2.043	2.014	2.141	2.390
NOTM (%)	14.9	16.1	16.9	9.8
PREVM (%)	2.1	4.1	1.4	3.7
CATH (%)	2.2	13.4	56.3	4.9
PROTB (%)	2.2	18.4	18.3	63.0
OTHREL (%)	84.8	55.8	14.1	6.2
NOREL (%)	8.7	7.4	4.2	16.0
FAED	8.681	4.461	5.352	8.524
FADG (%)	12.8	0.5	-	2.4
FAOC	43.447	28.009	30.972	31.329
FAFOR	21.3	21.2	28.2	20.7
MOED	8.717	4.770	5.366	9.049
MODG (%)	2.2	0.5	1.4	1.2
MWK1 (%)	6.4	9.7	11.3	7.3
MWK2 (%)	8.5	2.3	5.6	2.4
MWK3 (%)	4.3	11.1	5.6	7.3
MOFOR (%)	8.5	2.8	2.8	6.1
BPFOR (%)	51.1	49.8	46.5	43.9
NOTLI (%)	4.3	12.0	11.3	13.6
CITY (%)	21.3	18.4	19.3	14.6
TOWN (%)	2.1	22.1	19.7	25.6
RURF (%)	4.3	24.4	21.1	25.6
CITY 16 (%)	23.9	21.7	18.3	27.2
TOWN 16 (%)	2.2	20.3	16.9	19.8
RURF 16 (%)	4.3	39.2	39.4	35.8

	<u>Jews</u>	<u>Ukrainian</u>	<u>Polish</u>	<u>Norwegian</u>
ATL (%)	4.3	0.5	1.4	2.4
QUE (%)	25.5	0.9	1.4	2.4
PRA (%)	31.9	67.3	62.0	53.7
BC (%)	8.5	14.7	4.2	26.8
ATL 16 (%)	4.3	-	1.4	2.5
QUE 16 (%)	30.4	2.3	2.8	1.2
PRA 16 (%)	32.6	78.8	67.6	65.4
BC 16 (%)	4.3	7.8	1.4	19.8
ATLB (%)	4.3	-	1.4	1.2
QUEB (%)	28.3	3.2	4.2	1.2
PRAB (%)	34.8	85.3	64.8	71.6
BCB (%)	2.2	2.8	1.4	13.6
n	47	217	71	82

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