

CANADIAN INTERPROVINCIAL MIGRATION AND EDUCATION, 1966-1971

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Résumé — Une connaissance de la mobilité des gens lettrés est un élément important au proposeur de politique. Il y a de nombreux moyens d'examiner la mobilité des gens lettrés. Les taux de migration désagrégés par l'éducation est le premier pas. Deuxièmement, un modèle explicatif de migration désagrégé par le niveau d'éducation est utile quand on veut savoir s'il y a de différences facteurs qui entrent dans la décision de déplacement d'une personne plus lettrée que dans celle d'une personne moins lettrée. Dans la présente étude on note qu'il n'y a aucun effet puissant net sur la structure éducative de n'importe quelle région à cause de la sélectivité éducative de la migration, mais on note que plus le niveau d'éducation est élevé plus il est probable que les variables économiques orthodoxes explicatives sont importantes et plus efficaces seront les politiques destinées à alléger les obstacles tels que la distance et la langue.

Abstract — Knowledge about the mobility of educated people is an important element for the policy setter. There are numerous ways to examine the mobility of educated people. Migration rates disaggregated by education constitute a first step. Secondly, an explanatory model of migration disaggregated by education level is useful in learning whether there are different factors entering into the decision to move for a more educated person than for someone with less education. In this paper, we note no strong net effect on the educational structure of any region due to educational selectivity of migration, but we do note that the higher the level of education, the more likely orthodox economic explanatory variables are significant and the more effective will be policies designed to alleviate barriers such as distance and language.

Key Words — Canadian; migration; interprovincial; education

I. Interrelations between Education, Productivity, and Economic Growth: A Summary Statement

Losses to one province and gains to another province because of interprovincial migration can be categorized into three areas. First, the additional lifetime productivity generated by education may be lost to the province that the individual is leaving and gained by the recipient province. Second, the tax revenues change by some factor times the additional income generated because of the extra education. Third, there is a transfer from the sending to the receiving province of the non-monetary benefits of education such as social norms and values, good citizenship, economic development, and so forth. It has been argued that education is a direct as well as an indirect input into economic growth. Myers and Harbison (1963), Svennilson, et al. (1962), Denison (1962), and Schultz (1961) each address this question, and the results indicate a high positive correlation between an index of human resource development and G.N.P. per capita. Whatever the actual figures, it appears that mobility of educated people can transfer some growth potential from one province to another, which is an extremely important element for the policy setter.

The connection between education and mobility is one worth studying in greater depth. Since the individual does not appropriate all the benefits of education, taxpayers

should pay a portion of education costs (Preston, 1966). The presence of substantial risk, in the absence of insurance, causes some elements of aggregate demand (private) to be deficient (Nerlove, 1972), and this also leads to the payment of education costs by the taxpaying public. Therefore, the migration of educated people will cause an under-allocation of resources to education in either the sending or receiving area, and possibly both. Thus, knowledge about the movement of educated people can be useful in discussions on education financing and the role of intergovernmental transfers for educational purposes.

The paper's first part examines the literature on migration as it relates to education. Second, a review of the migration rate disaggregated by education level establishes the importance of the phenomena being dealt with and some of the parameters of this work. Third, a regression model with migration disaggregated for education is used to examine whether different factors enter into the decisions to move for a more educated person than for someone with less education. Finally, the last section of the paper discusses the merits of the regression model chosen over alternatives.

II. Literature on Migration and Education

One of the most consistent findings of migration studies is that migration rates are higher for the more educated groups. Stone (1969), Marr, et al. (1976a, 1976c), and McInnis (1970) show this to be the case at the time of migration and later when former migrants are compared to those who have never migrated. These studies consistently show that non-migrants have a higher percentage of people with elementary school education or less while migrants have a higher percentage of university graduates.

In most literature dealing with the relationship between migration and education, education has been treated as an independent variable with some explanatory power for migration; the coefficient of determination is most often significant and positive, indicating that as one obtains a greater amount of education, one is more likely to be mobile. Migration rates (gross) tend to confirm this type of analysis. In recent years, however, several research efforts demonstrated that the poorly educated are almost as likely to be involved in a short-distance move as the highly educated. Those educated to the high-school level are most likely to stay in one area or at least have the fewest residence changes (Long, 1973; Folger and Nam, 1967).

The natural outgrowth of such studies is an examination of the correlation between education and migration as the distance of a move increases. Suval and Hamilton (1965) show that the correlation between education and migration increases as the distance of migration increases. Although O'Neill (1970) contradicts this result, Schwartz confirms the earlier work of Suval and Hamilton. In Canada, McInnis disaggregates the migrants by education levels for the 1961 census and finds that "the deterrent effect of distance turns out to be positively related to levels of education" (McInnis, 1970:202). As Schwartz and McInnis both point out, the expectation is that the market for the more highly educated is more national in scope and that those with higher education have available to them more and better information concerning job opportunities. Others such as Greenwood (1975) and Schwartz (1973) suggest that education reduces the importance of cultural and family ties (the psychic costs of distance).

Why did O'Neill and McInnis find contrary to expected relationships between distance and education? McInnis estimates a linear regression of the form:

$$\frac{M_{ij}}{P_i} = a_0 + a_1 E^* + a_2 L_j - a_3 D_{ij} + u$$

where he disaggregates $\frac{M_{ij}}{P_i}$ into 25 to 34 year-olds with elementary, secondary, and

university education and over 35 year-olds with the same education. E^* is earnings differences between sending and receiving provinces, L_j is the size of the labour force in the recipient province, and D_{ij} is the distance between the sending and recipient provinces. The coefficient of the earnings variable is as expected if differential migration reflects differing strength of response to economic opportunity (the coefficient is highest for the young, highly educated group). For the university educated, the size of the recipient labour force is a significant determinant. The present study differs from McInnis's research in that migration into disaggregated into more educational categories, a greater number of explanatory variables are used, data comes from the 1971 Census, and all migrants rather than just males are examined.

III. Migration Rates by Education Level

An examination of the migration rates for each education level can only be carried out within the confines of agreed-to definitions. A migrant is any person who lived in one province on June 1, 1966, and another province on June 1, 1971. This is the definition of migrants used by Statistics Canada for the 1971 Census. While there are problems associated with this definition, the bias is consistent across provinces. We deal only with migrants 15 years of age or older who worked at least 40 weeks between January 1, 1970, and June 1, 1971. Another problem is that a person could have migrated and returned to the province of residence, with no record made of the move, or made multiple moves and be counted as having made only one move. Education is defined as formal schooling received prior to June 1, 1971. The education could have taken place after migration, but we are again constrained by the available data.

The rates in Table 1 examine migration in both directions, by subtracting the gross out-migration from the gross in-migration by province for each education level considered, but include only those education levels with which this paper deals. Although there are data available on the migration of those with grade 12 and grade 13 education, they vary as to when senior matriculation has been achieved in each of the provinces and, therefore, have been eliminated from consideration. Similarly, vocational training data are available, but for many programs the absolute numbers are too small for drawing meaningful conclusions (Marr, et al., 1978). It will be noted in Table 1 that two provinces have a net addition to population for all educational levels considered here: British Columbia and Ontario. Nova Scotia, Quebec, Manitoba, and Saskatchewan share the dubious distinction of having lost population in all educational categories through migration.

TABLE 1. NET MIGRATION RATES BY EDUCATIONAL LEVELS,
1966-1971^a

| | Nfld. | P.E.I. | N.S. | N.B. | P.Q. | Ont. | Man. | Sask. | Alta. | B.C. |
|----------------------------|-------|--------|------|------|------|------|-------|-------|-------|------|
| M.A. or Ph.D. Degree | 5.0 | 9.9 | -1.5 | 0.1 | -3.4 | 4.0 | -9.4 | -18.8 | -0.2 | 4.1 |
| B.A. or First Professional | -3.2 | 4.6 | -0.7 | -6.9 | -4.3 | 3.2 | -10.2 | -22.6 | 5.1 | 5.5 |
| Some University | -4.5 | -2.7 | -0.6 | -3.6 | -3.3 | 1.8 | -3.0 | -14.1 | 3.9 | 6.4 |
| Highest, Grade 11 | -3.8 | -0.7 | -0.9 | -0.7 | -1.2 | 1.1 | -3.1 | -6.5 | 1.5 | 5.4 |
| Highest, Grade 9 or 10 | -4.6 | -1.0 | -1.1 | -1.4 | -0.8 | 0.6 | -2.4 | -6.3 | 1.4 | 5.1 |
| Highest, Grade 5 to 8 | -2.5 | -0.7 | -0.5 | -0.5 | -0.5 | 0.5 | -1.7 | -3.4 | 0.6 | 4.3 |
| Less than Grade 5 | -0.7 | -0.8 | -0.2 | 0.0 | -0.3 | 0.3 | -0.5 | -1.9 | 0.0 | 2.8 |

^aNet migration is the in-migration rate (normalized by the receiving province's 1971 population) less the out-migration rate (normalized by the sending province's 1971 population) so that a positive net migration indicates an addition to the province's population in that educational category.

Source: Special Census Tabulations

In reviewing earlier U.S. censuses, Shryock and Nam (1965) and Suval and Hamilton (1965) concluded that migration to and from the U.S. South had a favourable net effect on the educational structure of the South. Table 1 does not confirm that the poorer regions of Canada receive a similar improvement in educational structure. Ontario and British Columbia, two provinces with relatively high per capita income, receive positive migration at the higher levels of education. Although Newfoundland, Prince Edward Island, and New Brunswick have positive net migration at the highest education level, the return student could explain this in part. Graduate students and professional students often complete their programs in Nova Scotia as part of an interprovincial agreement on education financing. In the 1960s, while universities in Quebec, Ontario, the Prairies, and British Columbia has less than 10 per cent of their enrolment made up of students from other provinces, universities in Nova Scotia and New Brunswick had in excess of 25 per cent (Zsigmond and Wenaas, 1970:216-223). Thus, the influx of those with M.A. and Ph.D. degrees may be people who were studying in another province in 1966 but who are not migrants in the sense of this paper. Unfortunately, census data do not permit separate analysis of these people to determine if Newfoundland, Prince Edward Island or New Brunswick have a positive net migration rate for highly educated migrants of the sort in which we are interested.

While there has been a great deal of concern with the "drain of talent" from the Maritime provinces as a whole, it would appear that the drain is less significant than feared. The net losses in Newfoundland are larger for those with a high-school education than those university trained; similar trends appear in Prince Edward Island and Nova Scotia, only less pronounced. Only New Brunswick appears to lose heavily at the upper levels of education. Actually, Manitoba and Saskatchewan lose more of their higher educated people vis-a-vis lower educated people than do other provinces, but one rarely hears of a concern about the "brain drain" from those provinces.

IV. A Model of Migration Determinants

A log-linear multiple regression model is used to examine the determinants of migration. The dependent variable is the migration rate of people from province i to province j who have attained a given level of education. The independent variables are the costs and benefits of migration. This attempts to answer the question, "Do people with different education levels respond to the same migration determinants?" There are advantages to using the log-linear form of the model. For instance, a given parameter is an estimate of the elasticity of migration with respect to a change in independent variable. Moreover, at the pragmatic level the F-values and R-squareds prove to be superior to other estimates made (e.g., a linear model).

The hypothesis basic to the model is that the potential migrant will make his (her) decision to move on the basis of pecuniary and non-pecuniary costs and benefits, the determinants of migration. In the absence of coercion, the person chooses to remain in province i or migrate to province j by comparing the additional lifetime costs and benefits of staying in i with the additional costs and benefits of migrating to j ; all marginal costs and marginal benefits are compared.

The most important aspect of the costs and benefits to be considered is the expectation of a future lifetime stream of income Y^e which the current price of labour in that occupation, anticipated changes in that price (regardless of whether it is due to changes in productivity or some other cause), and changes in the employment prospects for the specific occupation being examined affect. Expectations about future lifetime income in each region vary because each region experiences different time patterns of change and development.

In a model of migration, incomes (Y) and unemployment rates (U) in the sending and receiving provinces approximate these determinants. Income is average employment income for the Canada-wide majority sex in a specific educational category for persons 15 years of age and over who worked full-time in 1970 (40-52 weeks) by province.

Other income variables examined but rejected on econometric grounds included provincial-specific income, education-specific absolute differences between receiving and sending incomes, provincial-specific absolute differences between receiving and sending incomes, education-specific ratio of sending to receiving incomes, and province-specific ratio of sending to receiving income. Unemployment rates are calculated from the number unemployed in the Canada-wide majority sex in the labour force for each province divided by the labour force in the Canada-wide majority sex by province. Unemployment is the average of 60 monthly unemployment rates by province January 1966 to December 1971. Thus, we avoid the problems of using end-of-period unemployment rates, but, clearly, simultaneity problems are not avoided. Other unemployment variables examined but rejected on econometric grounds included the unemployment rate in the sending province and the reciprocal of unemployment rate in the receiving province, the unemployment rate in the receiving province and the reciprocal of the unemployment rate in the sending province, the absolute difference in unemployment rates between the sending and receiving provinces and the absolute difference in unemployment rate between the sending and receiving provinces if positive but otherwise zero, and education-specific unemployment rates in the sending and receiving provinces. Thus, for plumbers the rate is likely to be male-based, whereas for nurses it is likely to be female-based. While the use of the majority sex is sub-optimal, data limitations in published Census tables forced this upon the study; since income and unemployment data were unpublished for small cell sizes, true rates and averages could not be calculated.

A pecuniary cost of moving is associated with distance. Distance thus becomes a proxy for a series of opportunity costs, including the personal transport cost, the costs of transporting movable personal property, and income foregone during the period of migration, which may include time devoted to job search in the recipient province. There are also non-pecuniary costs associated with distance in that family ties must be broken and friendships cut (psychic costs). In the model, the reciprocal of distance ($1/D$) is used to take account of the diminishing marginal costs as the move gets longer. Thus, a move of several hundred miles ensure that both the pecuniary and non-pecuniary costs are felt, but if one is moving from Fredericton the marginal cost of moving to Vancouver instead of Calgary is small.

Amongst the non-pecuniary costs and benefits are those related to language ($Lang_{ij}$). In the model, for a move from province i to province j , the language variable used is the absolute difference between provinces in the percent of the population 15 years of age and over who speak English or who speak English and French.

The resulting model is:

$$\log M_{ij}^e = a + b_1 \log Y_i^e + b_2 \log Y_j^e + b_3 \log U_i + b_4 \log U_j + b_5 \log (1/D) + b_6 \log (Lang_{ij})$$

Estimates of the coefficients are made by least squares based on linear relationships between specific independent variables and the dependent variable. The expected sign for b_2 , b_3 , and b_5 is positive and for coefficients b_1 , b_4 , and b_6 is negative. While the relationship between education and migration may be age-related, this is omitted here; this may, however, be very important. Other variables were considered such as an

information variable (previous migrants from province *i* to province *j* normalized), a back-migration variable (those born in province *j*, living in province *i* normalized), taxes in the sending and receiving provinces, employment growth in the sending and receiving provinces, and climate. The addition of these variables did not enhance the results as the R^2 was little improved and the F-value decreased. There were also difficulties in interpretation as variables such as information are subject to simultaneity problems. Thus, only those variables upon which one can develop strong *a priori* hypotheses as found in Tables 2 to 5 are included.

Table 2 contains the regression coefficients for the educational levels under consideration when only those cells that have an absolute value ≥ 50 are considered. The latter condition is introduced because the number of small cells is significant and Statistics Canada carry out random rounding. Those small cells are, therefore, less than 100 per cent accurate. The expected signs are found in most instances. The positive coefficient for receiving unemployment rates is the only consistent sign that is not predicted *a priori*. Obviously, there may be some simultaneity inherent in our measure of unemployment in the receiving province since, if people are unemployed upon their arrival, they would cause a rise in the unemployment rate in the new province. There are two negative signs on coefficients for receiving income and one negative sign on the coefficient for sending unemployment, indicating that the determinants of mobility differ for various education levels.

It would appear that the hypothesis that the determinants of migration differ by education level is borne out. For instance, the elasticity with respect to sending income for those with Masters or Ph.D. degrees is approximately 85 times that for those with less than grade five education. However, it needs to be borne in mind that the majority of masters and doctoral degrees issued in Canada since 1960 are unlikely to be related to age and to young persons at the beginning stages of their careers; this does not necessarily hold true for persons with less than grade five education. For receiving

TABLE 2. REGRESSION COEFFICIENTS BY EDUCATION LEVEL, LOGARITHMIC FUNCTION, GROWTH MIGRATION GREATER OR EQUAL TO 50
(Standard error in parentheses)

| | Masters or Ph.D. Degree | Bachelor or First Professional Degree | Some University | Highest Grade 11 | Highest Grade 9 or 10 | Highest Grade 5 to 8 | Less Than Grade 5 |
|-------------------------------|-------------------------------|---|--------------------|---------------------|-----------------------------|----------------------------|----------------------|
| Constant | 38.54 | 53.20 | 14.74 | -18.99 | - 4.09 | -11.84 | - 6.42 |
| Sending Income (-) | - 5.09* (1.62) | - 4.32* (.77) | - 1.26* (.59) | - .41 (.99) | - .87 (.68) | - .22 (.53) | - .06 (.08) |
| Receiving Income (+) | 1.59 (1.57) | - 1.07 (.77) | -.03 (.63) | 2.91* (.95) | 1.50* (.70) | 1.75* (.53) | 1.12* (.54) |
| Sending Unemployment (+) | - .51 (.29) | .35* (.18) | .48* (.18) | .49* (.19) | .33 (.22) | .29 (.22) | .20 (.28) |
| Receiving Unemployment (-) | .49 (.26) | .52 (.18) | .21 (.18) | .43 (.20) | .35 (.22) | .47 (.24) | .43 (.28) |
| Reciprocal of Distance (+) | .66* (.09) | .80* (.08) | .93* (.08) | .99* (.10) | .90* (.11) | .95* (.11) | .94* (.15) |
| Language (-) | - .28* (.04) | - .25* (.03) | - .26* (.04) | - .37* (.04) | - .33* (.04) | - .42* (.04) | - .43* (.05) |
| R^2 | .76 | .84 | .76 | .75 | .68 | .73 | .76 |
| F | 24.46 | 60.21 | 40.01 | 35.33 | 28.01 | 33.80 | 21.55 |

*Significant at the 5% level and the expected sign.

income, while the elasticity remains similar, the coefficient is only significant for those with education of grade 11 or less.

Both distance and language appear to be greater disincentives to those with the lesser levels of education. For distance, the elasticity for those with less than grade five is approximately 50 per cent larger than the elasticity for those with the highest level of education. Similarly, the elasticity for language for those with less than grade five education is 150 per cent the elasticity for those with Masters or Ph.D. degrees. Therefore, those with higher education are less deterred by distance or by differences in the language composition of the recipient and sending provinces.

Our results differ from those of McInnis but agree with those for the United States by Suval and Hamilton and Schwartz. It would appear that the psychic costs of moving must be less for highly educated people or that the labour market is nationwide for those people. The latter appears to be more plausible because for those with M.A.s or Ph.D.s there were movements toward provinces that were losing in all other educational categories (Table 1), which is inconsistent with decreased psychic costs.

A further interesting result becomes apparent from the significance of the coefficients for those with some university education or first degrees. Here, the most significant variables aside from distance and language are those in the sending provinces. Both unemployment and lower incomes in the sending provinces act as push factors, while incomes and unemployment rates in the recipient provinces exert no great influence. This is inconsistent with studies in the United States by Lowrie (1966) and Perloff (1960) who argue that localities with attractive economic conditions draw large numbers from other localities but only small numbers from any one locality. In our estimates, the groups with lesser education levels behave more in this way although the coefficient for receiving unemployment is insignificant.

V. Alternative Specifications of the Model

One alternative to the model includes all gross flows greater than zero. There may be some reason to do this, as the population of the Maritime provinces suggests that the migration out of those provinces is now omitted, particularly at higher education levels, in the model that constrains cell size to ≥ 50 . But recall that in small cells random rounding could have a relatively larger effect. The results, however, are found in Table 3.

Differences in the results are noticeable. Sending income is only important as a factor in the migration decision for those with first degrees. Also, the elasticity with respect to distance decreases even more drastically as there is greater education. This time, the deterrent for low education levels is 170 per cent greater than for high education levels. While language barriers exist and are statistically significant, elasticity varies little as education levels changes. This is in contrast to the earlier case where the elasticity decreased as the persons had more education. While for most levels of education the R^2 and F values are lower, the F value for M.A.s and Ph.D.s increases in this specification, and it is this group that is most subject to small cell size.

Unlike the case where cell size was constrained to ≥ 50 , orthodox economic theory does not explain movements of persons with M.A.s and Ph.D.s. Income and unemployment appear to be insignificant as factors in moves for this group for this period of years examined. While this may lend credence to the idea that more highly educated people move only when they have a job or when they are being moved by an employer, it is probably the problems associated with small numbers that give us these results.

Table 4 uses the movement of people by education level where cell size is ≥ 50 . Here,

TABLE 3. REGRESSION COEFFICIENTS BY EDUCATION LEVEL, LOGARITHMIC FUNCTION, GROSS MIGRATION GREATER THAN ZERO
(Standard error in parentheses)

| | Masters or Ph.D. Degree | Bachelor or First Professional Degree | Some University | Highest Grade 11 | Highest Grade 9 or 10 | Highest Grade 5 to 8 | Less Than Grade 5 |
|-------------------------------|-------------------------------|---|--------------------|---------------------|-----------------------------|----------------------------|----------------------|
| Constant | 12.15 | 35.67 | - 4.44 | -17.14 | -14.94 | -21.20 | 3.60 |
| Sending Income (-) | - .89 (1.01) | - 3.09* (.71) | - .15 (.55) | - .24 (.85) | - .18 (.63) | .63 (.50) | - .05 (.04) |
| Receiving Income (+) | .005 (.95) | - .31 (.71) | 1.16* (.55) | 2.64* (.85) | 2.26* (.63) | 2.20* (.50) | .04 (.04) |
| Sending Unemployment (+) | .17 (.17) | .34* (.16) | .48* (.17) | .42* (.19) | .42* (.21) | .37 (.23) | .03 (.25) |
| Receiving Unemployment (-) | .52 (.19) | .43 (.16) | .21 (.17) | - .06 (.19) | .04 (.21) | .10 (.23) | .01 (.24) |
| Reciprocal of Distance (+) | .61* (.08) | .93* (.07) | 1.06* (.08) | 1.03* (.09) | 1.07* (.10) | 1.11* (.11) | 1.03* (.12) |
| Language (-) | - .31* (.03) | - .23* (.03) | - .24* (.04) | - .31* (.04) | - .27* (.04) | - .36* (.04) | - .37* (.04) |
| R ² | .68 | .78 | .72 | .69 | .66 | .65 | .69 |
| F | 30.49 | 54.61 | 39.24 | 33.95 | 29.41 | 29.12 | 28.14 |

*Significant at the 5% level of expected sign.

TABLE 4. REGRESSION COEFFICIENTS BY EDUCATION LEVEL, LINEAR FUNCTION, GROSS MIGRATION GREATER OR EQUAL TO 50
(Standard error in parentheses)

| | Masters or Ph.D. Degree | Bachelor or First Professional Degree | Some University | Highest Grade 11 | Highest Grade 9 or 10 | Highest Grade 5 to 8 | Less Than Grade 5 |
|-------------------------------|-------------------------------|---|------------------------|-----------------------|-----------------------------|----------------------------|------------------------|
| Constant | 10.01 | 3.97 | .77 | .17 | .007 | -.0018 | .133 |
| Sending Income (-) | -.00063* (.00028) | -.00028* (.000091) | -.000082* (.000027) | -.000036 (.000012) | -.000006 (.000004) | -.000002 (.000003) | -.000028* (.000014) |
| Receiving Income (+) | .000062 (.00026) | -.00014 (.000091) | -.000038 (.000028) | .0000048 (.000011) | .0000082* (.000004) | .0000063* (.000003) | .0000045 (.000013) |
| Sending Unemployment (+) | -.32 (.13) | .027 (.040) | -.00045 (.0088) | -.0013 (.0019) | -.0016 (.0011) | -.0016 (.00085) | -.0049 (.0046) |
| Receiving Unemployment (-) | .064 (.12) | .045 (.04) | -.00049 (.0089) | .0012 (.0021) | .00051 (.0012) | .00019 (.00095) | .0024 (.0043) |
| Reciprocal of Distance (+) | 1203.6* (197.1) | 657.5* (66.1) | 188.5* (15.7) | 44.5* (4.10) | 17.7* (2.18) | 10.3* (1.73) | 21.2* (11.1) |
| Language (-) | -.032* (.0085) | -.012* (.0033) | -.0028* (.00095) | -.001* (.00021) | -.00049* (.00011) | -.00034* (.000086) | -.00083* (.00048) |
| R ² | .60 | .76 | .73 | .74 | .58 | .47 | .31 |
| F | 12.06 | 35.41 | 34.56 | 34.25 | 18.66 | 11.60 | 3.85 |

*Significant at the 5% level of expected sign.

instead of regressing logs, the data are regressed directly in linear form. Interpretation of the regression coefficients is more difficult because they no longer represent an elasticity. The signs and significance of the coefficients are of interest, however. In Table 4, the coefficient for sending income is significant for the four highest levels of education as well as the lowest. The magnitude of the coefficient is 22.5 times greater for the highest level of education than the lowest level, indicating that rising income in the sending

province acts as a greater deterrent for the higher educated than for the lower educated people. Likewise, receiving income acts as more of a draw for highly educated than for lower educated people even though it is only significant for those who have completed senior elementary school or junior secondary school. Unemployment in the recipient and sending provinces is insignificant and generally of the wrong sign. Distance is 57 times more important to the highly educated than to the least educated. Thus, the highly educated are more likely to move long distances but the coefficient is of the right sign (i.e. distance acts as a deterrent to movement) and is consistently significant for all education levels. The language factor is also significant for all education levels and of the right sign. People are less inclined to move to areas where the percentage of people who speak no English is smaller. The factor is more important to those with higher levels of education.

TABLE 5. REGRESSION COEFFICIENTS BY EDUCATION LEVEL, LINEAR FUNCTION, GROSS MIGRATION GREATER THAN ZERO
(Standard error in parentheses)

| | Masters or Ph.D. Degree | Bachelor or First Professional Degree | Some University | Highest Grade 11 | Highest Grade 9 or 10 | Highest Grade 5 to 8 | Less Than Grade 5 |
|-------------------------------|-------------------------------|---|------------------------|------------------------|-----------------------------|----------------------------|------------------------|
| Constant | .15 | 2.31 | .27 | .069 | -.02 | -.017 | .069 |
| Sending Income (-) | .000079 (.00017) | -.00019* (.000068) | -.000047* (.000021) | -.000024* (.000009) | -.000003 (.000003) | -.0000003 (.000002) | -.000015* (.000009) |
| Receiving Income (+) | -.00011 (.00016) | -.00009 (.000068) | -.000002 (.000021) | -.000012 (.000009) | -.00001* (.000003) | .0000073* (.000002) | .0000092 (.000009) |
| Sending Unemployment (+) | .109 (.068) | .045 (.027) | .0024 (.0072) | -.00038 (.0017) | -.0011 (.00092) | -.0012 (.00069) | -.005 (.0046) |
| Receiving Unemployment (-) | .107 (.075) | .049 (.027) | .003 (.00072) | .00034 (.00017) | .00007 (.00092) | -.000051 (.00069) | .000027 (.0026) |
| Reciprocal of Distance (+) | 1376.2* (145.0) | 719.8* (51.9) | 205.3* (14.2) | 47.8* (3.62) | 19.0* (1.85) | 11.2* (1.39) | 27.2* (6.81) |
| Language (-) | -.041* (.0068) | -.012* (.0027) | -.0032* (.00086) | -.0011* (.00019) | -.00048* (.00009) | -.00035* (.000074) | -.00085* (.00027) |
| R ² | .64 | .75 | .73 | .71 | .60 | .50 | .37 |
| F | 24.84 | 46.12 | 40.86 | 37.54 | 22.92 | 15.79 | 6.85 |

*Significant at the 5% level of expected sign.

In concluding our evaluation of alternative specifications of the model, Table 5 reports the linear form of the regression model when cell size is $> \text{zero}$. As in Table 3, economic factors for those with M.A. or Ph.D. degrees almost disappear as significant explanatory variables. As in Table 4, unemployment in the sending and receiving provinces is insignificant. Here, there is little difference in R^2 but the F-values are greatly improved when compared to the linear form when cell size is ≥ 50 . When compared to the cases where the log linear form of the regression is estimated, the R^2 and the F-values are smaller.

VI. Concluding Remarks

The relationship between education and mobility was examined in two ways. First, it was established that migration rates were higher for those with the highest levels of education. For many provinces, there is a net loss of highly educated people, and this phenomenon is not one that is unique to the period 1966 to 1971 since McInnis and Stone have documented earlier periods.

There did not appear to be a strong net effect on the educational structure of any region due to the educational selectivity of interregional migration. While the net migration rates for highly educated people were greater than for those with less education, the fact is that both out and in migration rates are educational selective. Of course, the education variable used here pertains to the end of the migration period only; this is a general limitation in measuring socio-economic variables based on census data.

The most important part of the paper reports on whether the factors that influence the mobility of highly educated people differ from the determinants of migration for those with a lesser level of education. The elasticity of movement with respect to distance and language differences decreased with higher levels of education. Moreover, for highly educated individuals, the significance of incomes and unemployment rates in the sending provinces was noted. For those with lesser levels of education, recipient province incomes were significant but unemployment rates were not.

Variations of the specification of the model were less satisfactory in that interpretation was more difficult. Using all cases > 0 is inappropriate when random rounding has occurred. The linear form of the regression prevents an easy calculation of elasticities.

The results should be indicative of policy. Obviously, the highly educated individual may be more likely to stay put if the economic conditions in his originating locality are conducive to that decision. Improving conditions in recipient provinces may only act to attract those with lower levels of education if the findings for the 1966-1971 period have more general validity. Any programs to decrease distance barriers are unlikely to be effective without coincident education. This would suggest that education decreases the psychic cost of mobility and that it is psychic rather than pecuniary costs that are important. No doubt, informational differences exist, and the government may improve the economy's allocation of labour by decreasing those differences.

Thus, education played a significant role in the mobility of population in Canada between 1966 and 1971. Not only was education coincident with greater interprovincial mobility, but the determinants of that migration differed for the educated person. In fact, the differences in the migration determinants were such as to suggest that the more educated person acted more on the basis of orthodox economic factors and was subject to fewer psychic barriers than the person with a lesser level of education.

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