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CHAPTER 1

INTRODUCTION

The objectives of this study are to (i) conceptualize a classification of the potential economic benefits accruing from the improvement of television facilities serving remote communities in B.C., (ii) devise appropriate measures of these categories of benefits, and (iii) attempt by various means to obtain measurements of some of these benefits. Within this broad framework, major emphasis is given to the effect of reception improvement on labour turnover.

We decided to adopt a very broad interpretation of "remote", essentially considering any geographical area of the province not in the immediate vicinity of Vancouver or Victoria as experiencing some degree of "remoteness". The rationale for this interpretation is that remoteness connotes "distance from" something, generally from some amenity valued by at least some people. Under this interpretation, even a major urban centre such as Prince George experiences some degree of remoteness. Pushing this reasoning further, one could consider all of British Columbia as "remote" from some amenities, or alternatively, every area as "non-remote" from some things. Our interpretation is arbitrary but defensible on pragmatic grounds.

The economic benefits of improved television reception appear to stem primarily from the effect on a single variable, population stability. The available literature suggests that more stable population bases lead to greater identification on the part of the populace of their own long-term interests with the growth and development of their area of residence, leading to greater entrepreneurial activity and investment, and participation in the political and social life of the community. Thus to the extent that reception affects growth, it appears to do so largely through the intermediate link of population stability.

Apart from the growth effect, population stability reduces the costs of labour turnover to firms, providing an economic benefit. Since turnover is the major focus of this study, this argument will be elaborated in Chapter 2.

There is another link potentially of interest, in that improved reception may improve a community's ability to attract workers at all levels of the skill spectrum. This can have two economic effects: it can affect the cost (as opposed to the magnitude) of labour turnover, and can ameliorate the growth-inhibiting effects of labour shortages or skill bottlenecks.

It should be noted that we are not arguing that growth is always desirable, but only that it generally generates net economic benefits. There is a large literature suggesting that growth also generates substantial non-economic costs, at least in some cases.

Finally, some of the potential effects of improved reception on what can loosely be termed "human satisfaction" may yield economic benefits not captured in the effects noted above. These relate to the reduced private and social costs of alcohol and drug abuse and possibly certain types of crimes. For certain purposes, one may wish to consider the "entertainment value" of television as an economic benefit. For other purposes, this may be largely a non-economic benefit.

To recap briefly, we see the economic benefits of improved reception as falling in the following mutually exclusive categories.

A. Population Stability
   1. Growth
   2. Turnover

B. Ability to Attract Manpower

C. Costs of Anti-social Behaviour

D. (Possibly) Entertainment Value

This report investigates in detail only the effects of reception on labour turnover. Since we found it desirable on other grounds to attack the turnover question via an analysis of population stability, we have provided part of the groundwork for a study of growth effects. Chapter 2, which is the substance of this report, deals with turnover. Chapter 3 discusses the nature of additional work on the turnover question we feel would be fruitful, and presents some thoughts and preliminary evidence on the effects of improved reception on the other categories of economic benefits.

CHAPTER 2

LABOUR TURNOVER

I. Introduction

Labour turnover is universally acknowledged to be a very complex phenomenon to analyze, indeed even to define. We will herein use a very partial and simplistic model of the turnover process which allows us, at the cost of some precision, to focus on the question of interest. Turnover rates were defined by Statistics Canada, prior to the cessation of their collection and publication, as the lower of separation rates and accession rates. Further, separations include retirements, deaths, layoffs and voluntary quits. Our interest is clearly in voluntary separations, so we shall henceforth concentrate on the "quit rate" rather than the "turnover rate", where a quit is defined as a voluntary termination of employment initiated by the employee.

Variations in quit rates among establishments are assumed to be determined by three types of factors: employee attributes such as age and marital status, employer attributes such as wages and supplementary benefits and working conditions, and community attributes such as climate and availability of services. If these three categories of factors are viewed as separable and additive, the resulting model is very naive for two reasons. First, there are likely to be important interactions between categories of factors, e.g., the presence or absence of certain community services will be a consideration of importance only to married workers. Second, at the individual level the decision to quit is a dichotomous action representing (in general) a major change. As such, it is seldom based on a single consideration. Stated another way, it is not true that X_1 people quit their jobs because of employer attributes and X_2 because of community attributes. All (X_1+X_2) quits occur because of some combination of both types of attributes, where the nature of the combination and the weights attached to different attributes are in general not known even to the individuals themselves.

These problems are dealt with in the empirical work which follows in this section through the use of three assumptions.

1. Although the influences of given attributes cannot be disentangled at the micro level, they are assumed to be observable at the macro level as affecting the probability of quitting in an additive fashion.

2. Since we are estimating the effects of many other attributes on quit rates only in order to obtain estimates of the effect of one attribute, television reception, which are relatively free of omitted variable bias; we do not estimate interaction effects among these "other" attributes under the assumption that interactions will thus be included in main effects for these attributes.

3. Since we do not have data on employer attributes, we assume the effects of employer attributes on quit rates is independent of employee and community attributes.

The last assumption is the strongest, and no doubt the least realistic. The effects of this assumption on the empirical results are partially ameliorated by two considerations. First, average incomes for males and females and industry mix variables are entered into the analysis, partially accounting for employer attributes. Second, the dependent variable used is a migration rate proxy rather than a quit rate, under the rationale that quits which do not involve geographical migration could not have been prevented by any changes in community attributes. This has the effect of removing some of the primarily employer-attributes-related quits from the analysis. The fact remains that the omitted variables bias may be serious in the regression results due to inability to include more detailed employer attributes.

II. The Data

The data utilized are cross-section observations for area aggregates (AA's) in British Columbia as defined by Statistics Canada, using a number of attribute proxies from the 1971 Census of Population together with adjusted data from Anderson, et. al. (1973) on television reception. Area aggregates are geographical subdivisions defined for the first time in 1971. In metropolitan Vancouver and Victoria, area aggregates correspond to census tracts. In the rest of the province they are derived by aggregating enumeration areas (EA's) as defined for the 1971 census. There are a total of 374 AA's in British Columbia, 218 of which are census tracts. No data are published by the AA breakdown, so data were obtained from Statistics Canada on computer tapes. The variables used are listed below, using notation which will be continued throughout this chapter.

A. Dependent Variables

1. STAYERS - number of persons resident in the same municipality in 1971 as in 1966 (these persons are all 5 years of age or older in 1971).
2. POP5+ - total population aged 5 years and over in 1971.
3. 5+MOVES - number of persons who made five or more intermunicipal moves in the five year period 1966-1971.

B. Independent Variables - Census Data

1. PSWR - percent of dwellings connected to public sewer.

2. MUNW - percent of dwellings connected to municipal water supply.

3. MARR - percent of population aged 15 years and over which were married.

4. EDUC - percent of population aged 15 years and over who had an educational attainment of less than grade 9 completion.

5. AGE - percent of population aged 15 years and over who were in the age group 20-34 years.

6. FOREST - percent of labour force engaged in forestry.

7. MINE - percent of labour force engaged in mining.

8. MFG - percent of labour force engaged in manufacturing.

9. FYRM - percent of male labour force which worked full-year (50-52 weeks).

10. AVINCM - average income for males, expressed in thousands of dollars.

11. AVINCF - average income for females, expressed in thousands of dollars.

12. M/F - the ratio of males to females in the population aged 15 years and over.

13. NIND - native Indians as percent of population.

14. GROW - percentage growth in population from 1966 to 1971. (See below on calculation of 1966 population.)

15. OWNED - percent of dwellings which are owner-occupied.

C. Independent Variables - Climate

1. PRECIP - average annual precipitation, in inches.

2. SNOW - average annual snowfall, in inches.

3. TEMP - mean January temperature, in degrees Farenheit.

The climate variables pertain to the major municipality contained in the AA, or in a few cases, the average of the values for two municipalities.

In almost all cases the climate variables are long-term averages of values observed over ten to twenty years.

D. Independent Variables - Television Reception

1. BSTRCP - the source data coded reception on a scale from 1 (best) to 6 (unwatchable). This variable represents the best video reception code for any channel (interviewer's perception). In cases where data were available on both "cable" and "off-air", the former were used.

2. NCHANN - number of channels received with a "watchable" signal (i.e., a reception code of 5 or less).

3. TOTRCP - a total reception variable built by summing the reception codes for 10 channels, assigning a reception code of 6 to any channels not received in an AA. The theoretical maximum for this variable, applicable in an area with no reception whatever, is 60. The theoretical minimum, applicable in an area with "perfect" reception on 10 channels, is 10.

As in the case of the climatic variables, the television reception variables pertain to the major municipality contained in the AA, or in some cases the average of the values for two municipalities.

Since the source data on reception were gathered in the summer of 1973 and we were interested in migration between 1966 and 1971, it was necessary to adjust the reception data to pertain to an earlier period. This was done using information supplied by Mr. E. Piekaar of Communications Canada. Basically, NCHANN was reduced to account for new signals received since 1968, and BSTRCP was adjusted by using the best reception code (as of 1973) pertaining to channels received in 1968. In cases where signal quality, but not number of channels, changed between 1968 and 1973, no change was made to the data for lack of hard information.

E. 1966 Population

The final variable used in the analysis is 1966 population by AA, needed both to calculate the GROW variable and to provide a denominator for a meaningful dependent variable. Unfortunately, in order to use the area aggregate data tapes it was necessary to estimate 1966 population by AA, since this information is not tabulated by Statistics Canada for AA's which do not coincide with census tracts. The procedure followed was to obtain from Statistics Canada (i) a code list showing which 1971 enumeration areas comprised each AA, and (ii) a code list showing the correspondence between 1966 and 1971 EA codes. Computer printouts giving 1966 population by 1966 EA codes were obtained from the SFU Library.

The main problem encountered was that many 1966 EA's were "split" in the 1971 census in such a manner that portions of one EA are found in more than one AA. (In an extreme example, portions of one 1966 EA are found in six different AA's in 1971.) This makes it impossible (without recoding the micro data) to estimate 1966 population by 1971 AA code exactly. We obtained rough estimates of population and maximum error by first tabulating to include all possible double counting, and then correcting these totals by assuming that if part of a 1966 EA entered n 1971 AA's, 1/n of the 1966 population was found in each of the AA's affected. The maximum error was calculated by dividing the uncorrected totals by the corrected totals, and converting to percentages. The distribution of AA's by maximum possible error category are shown below. The 218 AA's with zero error are all census tracts, for which Statistics Canada recoded the micro data and published 1966 population figures (catalogue 92-712).

Max error (percent)	Number of AA's
0	218
1-10	17
11-20	42
21-30	41
31-40	26
41-50	19
51-60	8
61-70	3
Total	374

III. Reduction of Sample

Since the source data on television reception did not cover municipalities in all AA's, we were faced with the choice of either (i) estimating reception values based on data for nearby municipalities for the missing observations, or (ii) dropping the AA's with the missing data from the analysis. We opted for the latter approach under the rationale that since we wished to perform detailed statistical analyses, it was preferable not to introduce arbitrary variation into important variables.

This resulted in a decrease in the sample size from 374 to 272. (Viewed another way, instead of using a "census" of all of British Columbia, a non-random sample of 272 AA's was substituted.) A total of 45 census tract AA's covering the areas of North and West Vancouver, Richmond, White Rock and Delta were deleted from the sample. Of the 57 non-census-tract AA's deleted, 14 were in Saanich and 8 in and around Kelowna, with the rest widely scattered around the province.

On the other hand, not all of the source data on television reception available were used in this study. In cases where an AA contained part of a large municipality, as well as a small municipality for which reception data were available, we used only the data pertaining to the large municipality. Conceptually, some weighted average would have been a better measure, but census data provide no means for computing appropriate weights. (There is no means for determining the proportion of the population of a municipality which is found in each of the constituent AA's, assuming parts of the municipality are found in several AA's.) Given a choice between using the procedure actually adopted on using arbitrary weights, it was felt the former was more defensible, at least on grounds of simplicity.

IV. Regression Results

The main set of equations estimated used STAYERS divided by 1966 population, expressed as a percentage, as the dependent variable. This variable is denoted PCTSTAY in Table 1, where the results are reported. The raw data underlying these estimates are found in Appendix A. We are primarily interested in outmigration, not stayers, but if crude death rates are assumed to be constant across AA's, we can write:

$$(1)\quad \frac{OUTMIG}{POP_{66}} = (1-d) - \frac{STAYERS}{POP_{66}}$$

where POP_{66} represents 1966 population and d is the crude five-year death rate. Thus the stayer rate and the outmigration rate differ only by an additive constant and sign, and we can interpret coefficients (except the intercept) from an equation using PCTSTAY as the dependent variable as affecting the outmigration rate with the same magnitude but opposite sign.

Table 1 Regression Results, Dependent Variables = PCTSTAY
(t values in parentheses)

Eqn. No.	Intercept	NCHANN	BSTRCP	Channels Dummy C_1 1 or 2 Channels	Best Reception Dummies R_1 1<2	R_2 2<3	R_3 3<4	TOTRCP	Total Reception Dummies T_1 30<40	T_2 40<50	T_3 50<55	T_4 55+
1a	66.291 (5.93)	0.136 (0.54)	-2.798 (-3.89)									
1b	64.576 (5.90)		-2.495 (-3.58)	-4.550 (-3.09)								
1c	56.166 (5.19)			-5.398 (-3.45)	6.679 (2.42)	2.924 (1.11)	2.686 (1.02)					
1d	60.350 (5.14)							-0.102 (-1.65)				
1e	63.554 (5.65)								-4.288 (-3.01)	-5.350 (-2.64)	-7.245 (-3.13)	-10.2 (-4.3

Table 1 (cont'd)

Eqn. No.	PSWR	MUNW	MARR	EDUC	AGE	FOREST	MINE	MFG	FYRM	TEMP	PRECIP	SNOW
1a	0.059	-0.088	-0.277	0.233	-0.420	-0.239	0.030	0.248	0.170	0.107	0.001	0.001
	(2.75)	(-2.18)	(-2.75)	(2.65)	(-5.52)	(-2.13)	(0.26)	(4.00)	(2.13)	(1.12)	(0.08)	(0.03)
1b	0.056	-0.083	-0.271	0.247	-0.398	-0.238	-0.048	0.237	0.188	0.076	-0.012	0.012
	(2.70)	(-2.10)	(-2.74)	(2.85)	(-5.31)	(-2.19)	(-0.42)	(3.89)	(2.42)	(0.87)	(-0.64)	(0.48)
1c	0.047	-0.066	-0.265	0.231	-0.416	-0.268	-0.025	0.239	0.204	0.065	-0.010	0.018
	(2.19)	(-1.65)	(-2.68)	(2.64)	(-5.44)	(-2.46)	(-0.22)	(3.88)	(2.62)	(0.73)	(-0.50)	(0.72)
1d	0.066	-0.057	-0.261	0.245	-0.391	-0.280	0.011	0.203	0.159	0.142	-0.005	0.009
	(3.01)	(-1.42)	(-2.53)	(2.71)	(-5.03)	(-2.41)	(0.09)	(3.22)	(1.93)	(1.36)	(-0.28)	(0.34)
1e	0.048	-0.043	-0.206	0.211	-0.409	-0.223	-0.051	0.215	0.190	0.021	-0.003	0.008
	(2.15)	(-1.05)	(-2.43)	(2.37)	(-5.25)	(-1.94)	(-0.43)	(3.38)	(2.32)	(0.19)	(-0.14)	(0.31)

Table 1 (cont'd)

Eqn No.	AVINCM	AVINCF	M/F	NIND	OWNED	GROW	$\bar{R}^2$	S.E.E.
1a	0.216 (0.50)	1.949 (1.35)	-5.379 (-3.25)	0.057 (0.61)	0.172 (4.41)	0.268 (14.06)	.67	6.497
1b	0.302 (0.71)	2.138 (1.51)	-4.853 (-2.96)	0.128 (1.38)	0.168 (4.41)	0.273 (14.58)	.68	6.381
1c	0.273 (0.63)	1.628 (1.14)	-4.944 (-3.01)	0.107 (1.13)	0.164 (4.27)	0.276 (14.48)	.68	6.405
1d	0.235 (0.52)	1.977 (1.34)	-5.386 (-3.17)	-0.015 (-0.17)	0.182 (4.58)	0.263 (13.48)	.65	6.670
1e	0.301 (0.69)	1.132 (0.76)	-4.919 (-2.93)	0.073 (0.76)	0.159 (4.05)	0.268 (13.93)	.67	6.492

Turning to equation 1a of Table 1, it is observed that NCHANN has the correct sign, but is statistically non-significant. Since signs were hypothesized for all coefficients, one-tailed tests will be utilized throughout the discussion. Using a .05 level of significance, this means t values exceeding 1.645 in absolute value are associated with "significant" coefficients, provided the sign is as hypothesized. Since a larger value of BSTRCP is associated with poorer reception, this variable also has the expected sign, and is further statistically highly significant. At the point of means, the elasticity of PCTSTAY with respect to BSTRCP is only 0.076, but this is misleading because of the boundedness of the latter variable. Another way to intercept the coefficient magnitude is to note that if reception on the best channel is improved one point on the reception scale (e.g., from 4 to 3), PCTSTAY will increase by 2.8 percentage points, or, since the mean of the 272 observations on PCTSTAY in the sample was 66.8, an increase of 4.2 percent in PCTSTAY will result.

The results regarding "non-reception attributes" will be discussed briefly, in that the validity of the results regarding reception variables depend to an extent on the specification of the entire equation. Full results are reported in Table 1 for the interested reader. The PSWR and MUNW variables were included as proxies for the development of community infrastructure more generally. They are imperfect proxies for this, but were the best available from census data. Since it was assumed greater infrastructure development would lead to higher stayer ratios, positive signs were hypothesized for both coefficients. This expectation was realized for PSWR, which is significant, but MUNW has the wrong sign. This appears to be due to multicollinearity, since the simple correlation between PSWR and MUNW is high (r=.76), and the simple correlations between both of these variables and PCTSTAY are positive. The usual correction for this problem would be to drop MUNW from the regression and re-estimate. This was not done here because we were not particularly interested in the coefficient for MUNW and wished to account for the maximum amount of variation in PCTSTAY due to non-reception attributes. Thus, all variables originally introduced are included in the equations reported in Table 1, whether they turned out to be significant or not.

It was hypothesized that married persons would be less mobile than single persons, even after correcting for home ownership patterns. The results contradict this, as the coefficient for MARR is negative with large t values in all equations. This again appears to be a multicollinearity problem, as the simple correlation between MARR and OWNED is 0.74, and both variables have positive simple correlations with PCTSTAY. Unlike the case of PSWR and MUNW, where both variables were assumed to be proxies for the same effect, however, MARR and OWNED measure two distinct effects. Hence further investigation of the main effects and interaction of the latter two variables is a legitimate topic for future research for those persons interested in such things. The point germane to the current study is that the "strange" sign attached to the coefficient of the MARR variable appears potentially explainable, and does not in the authors' judgement detract from the reliability of the results regarding reception variables.

The migration literature suggests that young adults and more highly educated people tend to be more mobile than others. Both of these hypotheses are strongly supported by the results in Table 1.

Regarding the industry mix variables, it was expected that areas with a high proportion of their labour force engaged in the extractive industries, forestry and mining, would exhibit relatively low stayer rates. Because these industries are raw-materials oriented, they are often located in undeveloped areas with few amenities. They are also subject to greater fluctuations in the scale of operations due to seasonal and market factors than secondary or tertiary industries, which will operate to reduce the five-year stayer rate. The expectation is fulfilled for the case of forestry, but the coefficient for MINE is non-significant in all equations. The reasons for this latter result are not clear, but scattered evidence suggests the turnover rate, and hence the outmigration rate, may be lower in mining than in forestry. Again, this is an interesting topic for further research not critically relevant here. The third industry mix variable, MFG, has the expected positive sign and is highly significant.

One would expect stayer rates to be high where employment stability is high. This expectation is confirmed by the results for the FYRM variable.

None of the climatic variables is statistically significant, and one would have expected a negative sign for SNOW. There is a possible multicollinearity problem, in that TEMP and SNOW have a simple correlation of -0.77. There is a more serious potential multicollinearity problem in equation 1a, because large numbers of channels are received primarily in the metropolitan Vancouver and Victoria areas, and these areas are among the warmer and more snow-free areas of the province. This problem is less severe in the other equations, and does not occur with respect to the BSTRCP variable. On the basis of additional testing, we feel (i) there is some evidence stayer rates are affected by climatic variables, and (ii) the collinearity between NCHANN and the climatic variables does not seriously affect the reliability of the estimate of the effect of number of channels, particularly as the latter is measured in equations 1b and 1c.

The conclusion about the influence of climatic variables is based on principal components analysis of the independent variable set, where a fairly clearly defined climate component was isolated which turned out to be significantly related to PCTSTAY with the expected sign. These results are not reported herein. The conclusion regarding the reliability of the coefficients for the reception variables is based on the results of re-estimating equation 1b dropping the three climatic variables. This results in a coefficient for C_1 of -4.717 with a t value of -3.82, and a coefficient for BSTRCP of -2.677 with a t value of -4.03. These results are close to those reported in Table 1.

The coefficients for both income variables are positive, as expected, although neither is statistically significant. The large coefficients for AVINCF (relative to AVINCM) are probably due in part to the absence of a female labour force participation rate variable in the equation. The specification could be improved, at least cosmetically, by including this variable and combining the two average income variables into one overall average.

The male/female ratio was introduced as a proxy for "degree of development" (see Piekaar, 1975, p. 21). The coefficient has the expected negative sign and is strongly significant.

The native Indian variable was originally introduced to account for expected differences in migration rates in those AA's which were primarily composed of Indian reserves. These AA's were dropped due to other considerations when the sample was decreased from 374 to 272 observations, but the variable was retained. In three of the five equations reported in Table 1, NIND has the expected positive sign and in two cases the t value exceeds unity.

The OWNED variable has the expected sign and is strongly significant. As noted above, the coefficient magnitude is unreliable due to collinearity with percent married.

Finally, the coefficient of the population growth variable is positive, as expected, with an extremely large t value. Part of this could be spurious, in that measurement errors in POP_{66} will bias this coefficient upward given that 1966 population appears in the denominator of both PCTSTAY and GROW. Further, it was previously noted that POP_{66} contains potentially serious measurement error. We do not, therefore, advise literal interpretation of the coefficient of GROW; it is biased upward to an unknown extent. This should not seriously affect interpretation of the effects of the reception variables.

It was then decided to test for nonlinearities in the effects of the reception variables. Looking first at NCHANN, it was felt that adding one more channel would have a different impact if only one channel was received previously than if six channels were received previously, for example. Experimenting with various combinations of dummies it was determined that the effect of number of channels on PCTSTAY is such that if either one or two channels are received, PCTSTAY is negatively affected by approximately the same magnitude, but if three or more channels are received, there is no significant difference in the effect on PCTSTAY as more channels are added.

Thus equation 1b is reported, where the variable C_1 is substituted for NCHANN. This variable is equal to unity in AA's where only one or two channels are received, and equal to zero in all other AA's. The C_1 variable is strongly significant with the expected sign, whereas in equation 1a NCHANN is statistically non-significant. The interpretation of the coefficient of C_1 is that the stayer rate is 4.55 percentage points higher, on average, in areas which receive three or more channels than it is in areas which receive only one or two channels.

Since it was felt there might be nonlinearity in the effect of BSTRCP on PCTSTAY as well, equation 1c was estimated, using in this case three dummy variables defined as follows:

R_1 = unity for AA's where BSTRCP is one but less than two; zero in other AA's.

R_2 = unity for AA's where BSTRCP is two but less than three; zero in other AA's.

R_3 = unity in AA's where BSTRCP is three but less than four; zero in other AA's.

The interpretation of the coefficients for these dummies is that stayer rates are 6.68 percentage points higher in areas with best reception codes in the range 1<2 than in areas with best reception codes of 4 or more; 2.92 percentage points higher in areas with codes in the range 2<3 than in areas with codes of 4 or more; and 2.69 percentage points higher in areas with codes in the range 3<4 than in areas with codes of 4 or more. The t values reported in Table 1 refer to tests of these differences against a null hypothesis of zero.

Other comparisons are made by subtraction. Comparing areas with codes 1<2 to areas with codes 2<3 the coefficient is 3.755 with a t value of 3.21; comparing areas with codes 1<2 to areas with codes 3<4 the coefficient is 3.993 with a t value of 2.20; and comparing areas with codes of 2<3 to areas with codes of 3<4 the coefficient is 0.238 with a t value of 0.14. In sum, areas with reception codes in the range 1<2 are significantly different from all other areas, but all other comparisons are statistically non-significant. There were 152 areas in the sample with reception codes of 1<2, 83 with codes of 2<3, 29 with codes of 3<4, and 8 with codes of 4 or more. Of the 152 areas in the first category, 123 are in or near Vancouver and Victoria, and the remainder are in Penticton, Kamloops, and Prince George.

Thus the only statistically significant comparisons found essentially distinguish major urban centres from the rest of the province. This could be a spurious result, in that the reception attribute could be serving as a proxy for a large number of infrastructure attributes associated with urban centres which were not entered into the analysis. We will return to this question later, but will emphasize at this point that the coefficients for R_2 and R_3 have expected relative magnitudes and t values in excess of unity when compared to the omitted class (code 4 or more).

It was felt that a potential reason for the statistically weak results for the best reception dummies in equation 1c might be that we were trying to "get too much" from the data by estimating the effects of number of channels and reception code separately. Some empirical verification for this point is provided by the simple correlations between C_1 and the best reception dummies, in that areas which receive only 1 or 2 channels tend to be areas which have high reception codes (poor reception). We thus built the TOTRCP variable in an attempt to avoid this problem. As noted in equation 1d, this variable is just barely statistically significant, which is an incongruous result in terms of the results for equations previously discussed. It was determined that TOTRCP, as constructed, is not interpretable as a ratio scale. For example, the value of TOTRCP in Victoria is 13.47 and in Vancouver 28.00. In short this variable, if interpreted as a ratio scale, says reception in Victoria is twice as good as in Vancouver. Further, since the theoretical maximum for TOTRCP is 60, reception in Vancouver is barely twice as good as no reception whatever.

We thus converted TOTRCP into a set of dummy variables defined as:

T_1 = unity for AA's where TOTRCP is 30 but less than 40; zero in other AA's.

T_2 = unity for AA's where TOTRCP is 40 but less than 50; zero in other AA's.

T_3 = unity for AA's where TOTRCP is 50 but less than 55; zero in other AA's.

T_4 = unity for AA's where TOTRCP is 55 or more; zero in other AA's.

The results are reported in Table 1 as equation 1e. All coefficients have the expected sign, relative magnitude are as expected, and all are statistically significant compared to the excluded category (Total reception codes less than 30). Proceeding as we did with equation 1c, we can get coefficients for other comparisons by subtraction and test each difference for statistical significance. The results are shown in Table 2.

Table 2: Pairwise Comparisons for Total Reception Dummies in Equation 1e

Comparison	Coefficient	t Value
$T_4 - T_1$	-6.006	2.99
$T_4 - T_2$	-4.944	2.45
$T_4 - T_3$	-3.049	1.58
$T_3 - T_1$	-2.957	1.43
$T_3 - T_2$	-1.895	.88
$T_2 - T_1$	-1.062	.59

Thus of the ten pairwise comparisons possible, all but four are significant. There is no significant difference in PCTSTAY among areas with total reception codes in the range 30<55, though all comparisons have the correct sign even in this range, and the comparisons between T_4 and T_3 and T_3 and T_1 have substantial t values. There were a total of 100 AA's with TOTRCP less than 30, 79 with codes of 30<40, 26 with codes of 40<50, 22 with codes of 50<55, and 45 with codes of 55 and over. Given that both of the extreme groups are statistically significant or nearly so compared to all other groups individually, and that both extreme groups contain substantial numbers of AA's, this is strong evidence that reception does affect PCTSTAY.

We also estimated an equation using the rank value of TOTRCP instead of the variable itself. (A procedure suggested in Communications Canada, April 1975, p. 11.) The rank variable had a coefficient of -0.024 with a t value of -2.40, in short statistically significant with the expected sign. The t value is not as large as would have been expected however. This may be due in part to the ranking algorithm used, which randomly assigns ranks among tied observations, but we suspect is mostly evidence of remaining non-linearity in the rank series. We regard the estimates using dummy variables as more reliable and more easily interpretable.

Since the primary evidence in this report bearing on the question of whether reception affects turnover, and if so in what manner and to what extent, rests on analysis of the cross-section data, we felt it incumbent upon us to investigate additional properties of the sample data. The direction this supplemental analysis took was an analysis of selected interaction effects, specifically between education and reception and age and reception.

Kirsh, et. al. (1973, p. 121), note that there are no substantial differences in television viewing activity by age and education, but "the oldest group, the least educated, students, and housewives were, however, more noticeable among the heavy viewers than among the light viewers". This does not provide any a priori hypotheses regarding our results, as one could expect heavy viewers would be more concerned about reception, or that heavy viewers are by revealed preference more satisfied with current reception and programming.

In any event we proceeded by simply introducing cross-product terms. Reporting only partial results (the equations contained all of the non-reception variables contained in equation 1b) we obtained:

$$\text{(2)}\quad PCTSTAY = \underset{(-2.44)}{-11.909C_1} - \underset{(-4.89)}{11.546\ BSTRCP} + \underset{(1.73)}{0.297}\ (C_1)(EDUC) + \underset{(4.05)}{0.336}\ (BSTRCP)(EDUC) - \underset{(-1.81)}{0.268}\ EDUC + \ldots$$

$$\bar{R}^2 = .71 \qquad S.E.E. = 6.04$$

$$\text{(3)}\quad PCTSTAY = \underset{(0.24)}{1.282C_1} + \underset{(2.10)}{5.376\ BSTRCP} - \underset{(-0.95)}{0.150}\ (C_1)\ (AGE) - \underset{(-3.25)}{0.238}\ (BSTRCP)(AGE) - \underset{(-0.02)}{0.003}\ AGE + \ldots$$

$$\bar{R}^2 = .70 \qquad S.E.E. = 6.19$$

Three of the four cross-product terms are statistically significant, but unfortunately both AGE and EDUC become non-significant, and EDUC and BSPTRP switch sign with substantial t values. The estimations are not viewed as being reliable except perhaps near the point of means, but the directions of effect are interesting. From equations 2 and 3 we derive:

$$\text{(4)}\quad \delta PCTSTAY/\delta C_1 = -11.909 + 0.297\ (EDUC)$$

(5) $\delta PCTSTAY/\delta BSTRCP = -11.546 + 0.336\ (EDUC)$

(6) $\delta PCTSTAY/\delta C_1 = 1.282 - 0.150\ (AGE)$

(7) $\delta PCTSTAY/\delta BSTRCP = 5.376 - 0.238\ (AGE)$

At the means of AGE and EDUC, these expressions provide estimates close to those obtained in equation 1b in Table 1. Areas which have a higher than average percentage of their adult population in the education category "less than 9 years completed" will experience a lower than average response of PCTSTAY to changes in television reception. Similarly, areas which have a higher than average percentage of their adult population in the age group "20 to 34 years" will experience a higher than average response of PCTSTAY to changes in television reception. To illustrate the magnitude of the effect, consider expression 5. This expression implies that improving the reception code by one unit will increase PCTSTAY by 4.8 percentage points in areas with 20 percent of their population in the education category "less than 9 years", 3.2 percentage points in areas with 25 percent of their population in the same category, and by 1.5 percentage points in areas with 30 percent of their population in this education category.

One could continue in this vein and estimate interaction effects for all of the attributes included in the equations in Table 1; indeed one could attempt to estimate all of the interactions simultaneously. Unfortunately this process would introduce so much collinearity into the independent variable set that none of the results would be reliable.

Even in the simple example presented in equation 2 above, the simple correlation between C_1 and the product (C_1)(EDUC) is 0.97. We do not therefore consider this a useful approach.

In the following section we turn to an interpretation of the magnitude of the coefficients in Table 1, always interpreting these as relevant at the point of means. The proceding discourse on interaction effects is included in this report to emphasize that straightforward application of the results in this paper to specific areas with values of various attributes which depart substantially from the sample mean <u>may</u> provide misleading implications. The current "state of the art" in data analysis simply does not allow simultaneous estimation of effects, tests of their significance, and proper treatment of interaction.

V. <u>Interpretation of Results</u>

Interpretation of coefficient magnitudes will be restricted to equations 1c and 1e, given previous comments about deficiencies in the other estimates. The mean number of channels received in those AA's where C_1 is unity is 1.379, and in those AA's where C_1 is zero is 7.584. Thus we have estimated a difference of 6.205 channels is associated with a difference in PCTSTAY of 5.398 percentage points, or 0.87 percentage points per channel. Bearing in mind the nonlinearity in the effect of NCHANN that was the rationale for introducing the C_1 dummy, we can say that introducing one more channel in an area that previously received only two channels will increase the stayer rate by <u>at least</u> 0.87 percentage points.

To avoid giving a false impression of accuracy, we will round off to one percentage point, which is still probably a conservative estimate.

The mean of BSTRCP for those AA's for which R_1 = unity is 1.253, for those for which R_2 = unity is 2.079, for those for which R_3 = unity is 3.234, and for those with reception codes of four or greater 4.525. Using the coefficients from equation 1c, an improvement in the reception code of one unit from a base in the category 2<3 will increase the stayer rate by (6.679 - 2.924)/(2.079 - 1.253) = 4.5 percentage points. Improving the reception code by one unit from a base in the category 3<4 will increase the stayer rate by (2.924 - 2.686)/(3.234 - 2.079) = 0.2 percentage points. Finally, improving the reception code by one unit from a base in the category 4 plus will increase the stayer rate by (2.686)/(4.525 - 3.234) = 2.1 percentage points. The original source for the reception data (Anderson, et. al., 1973) described reception codes of 1 to 6 as excellent, fine, passable, marginal, inferior and unusable, respectively (more detailed description in source). Thus equation 1c indicates improving a marginal signal to passable will increase the stayer rate by 2 percentage points, improving a passable signal to fine has no effect on the stayer rate, and improving a fine signal to excellent has a very large (4.5 percentage points) effect on the stayer rate. As noted previously, the last comparison is probably contaminated by the fact that excellent signals are received primarily in Vancouver and Victoria, so the reception variable may be serving as a proxy for a number of omitted variables. For most applications of interest ("isolated" or "very remote" communities), the best estimate available from equation 1c is that improving a marginal (or worse) signal to passable will increase the stayer rate by 2 percentage points. The reader is reminded that this last comparison is based on a very small number of observation points, as there are only eight AA's in the reception category 4 plus.

Since the "weak" results from equation 1c are due in part to attempting to estimate the effects of number of channels and reception quality separately, let us turn to equation 1e. The means of TOTRCP are: 33.980 for AA's for which T_1 = unity, 44.304 for AA's for which T_2 = unity, 52.784 for AA's for which T_3 = unity, 56.585 for AA's for which T_4 = unity, and 24.248 for AA's in the omitted class, TOTRCP less than 30. We will focus attention only on a comparison of the two categories for which TOTRCP is largest, but means of other categories are provided so that the interested reader can perform other comparisons if desired.

AA's with total reception codes of 55 or more are characterized by reception of one channel with excellent signal, two channels with passable signal, or possibly three channels with marginal to inferior signals. AA's with total reception codes of 50 but less than 55 are characterized by reception of two channels with fine to excellent reception or three channels with marginal to passable reception. Other combinations are possible, but not realistic. For example, if ten channels are received with an inferior signal, TOTRCP = 50. The source data isolates no areas with this sort of reception profile.

Thus an improvement in reception which would transfer an area from the 55 plus category to the 50<55 category would in general entail introducing a new channel with passable reception quality or upgrading reception on two previously received channels by a point or two on the reception scale. A point estimate of the effect of such a change on PCTSTAY is (10.294 - 7.245) = 3.049 or roughly three percentage points. If a more minor change is contemplated, say a change of one unit on the TOTRCP scale in areas with TOTRCP approximately equal to 55, we calculate the effect on PCTSTAY as 3.049/(56.585 - 52.781) = 0.8 percentage points. In what follows we will speak of a "basic change" in reception as consisting of some combination of actions which improves reception by 3 points on the TOTRCP scale, and use as our estimate of effect "two to three percentage points" on the stayer rate.

VI. Application to Turnover

Finally, we come to the thorny question of applying these results regarding migration rates to quit rates. We frankly do not have data which allow us to do this in a very satisfactory manner, and will hence proceed to note probable effects under different assumption sets. The mean of PCTSTAY for the 45 AA's in our sample with TOTRCP of 55 or greater is 57.8 percent. The crude death rate for British Columbia over the five-year period 1966-1970 averaged 4.18 percent (Statistics Canada, 11-505, pp. 7, 12). Assuming the areas of interest had death rates equal to the provincial average, this means the outmigration rate over the five year period was about 38 percent for the average area in the set of areas of interest. A "basic change" in reception in the "average area of interest" would then have reduced the five-year outmigration rate by 2/38 = 5 percent to 3/38 = 7 percent.

Assuming average family sizes are the same for "movers" as for "stayers", and that improvements in television reception would not affect the quit decisions of persons who remain in the community after quitting, we need three additional pieces of information before we can estimate the effect of reception on quit rates.

1. Some outmigration does not involve quitting, even under our assumptions, in that persons may be unemployed for other reasons and then decide to move. Thus we need to know what percentage of outmigrants quit their previous employment.

2. We need to know overall quit rates, or equivalently, what percentage of persons who quit became outmigrants.

3. Since quit rates are usually expressed in terms of number of quits divided by average employment, we need to convert our five-year outmigration rate into an annual time dimension.

Hard data are not available on any of these points for the areas of interest, and one is forced to rely on scattered evidence and reasonable approximations.

Regarding the first point, Jenness (1969, p. 210), citing other studies, estimates geographical mobility rates for the unemployed to be twice as great as for the employed. Vanderkamp (1973, p. 24) reports that interprovincial migration rates are 1.5 times as great for the unemployed as for the employed. Since the unemployed may be more limited than the employed in their ability to finance long distance moves, these two estimates are not necessarily inconsistent. Assuming that the proper factor is two, we can solve:

$$(8) \quad \frac{OM_T}{POP_T} = \frac{POP_E}{POP_T}\left(\frac{OM_E}{POP_E}\right) + 2\,\frac{POP_U}{POP_T}\left(\frac{OM_E}{POP_E}\right)$$

to obtain the outmigration rate for the employed, given that we know total outmigration. In the notation, OM refers to outmigration, POP to population, and T, E and U to total, employed, and unemployed, respectively. The average unemployment rate for British Columbia for the mid-1966 to mid-1971 period was 5.9 percent (Statistics Canada, 11-505, p. 50), and there appears to be no systemmatic difference between "remote" and "non-remote" regions of the province (Statistics Canada, 94-790, p. 15). Using 0.38 for the total outmigration rate and 0.059 for the unemployment rate in equation 8, we get an estimate of 36 percent for the outmigration rate for employed persons. If we assume reception improvements affect the outmigration decisions of employed persons only, then a "basic change" in reception would reduce the five-year outmigration rate of employed persons by 2/36 = 6 percent to 3/38 = 8 percent. If we assume reception changes affect employed and unemployed persons' migration decisions equally then the previous estimate of 5 to 7 percent is still valid.

Regarding the overall quit rate, very scanty data are available. Piekaar (1975, p. 53) reports "the turnover rate in large centres like

Kitimat is 40-50% per year". MacMillan, et. al. (1974, p. 55) report the overall quit rate for 62 mining firms in Manitoba for 1972 to be 35 percent, with an overall separation rate of 42 percent. The latter study further reports (pp. 58-59) the quit rate for employees with less than one year of service to be 77 percent, for employees with one to five years of service to be 30 percent, and for those with over five years of service to be 4.6 percent. These are calculated from the source by dividing quits by tenure category by the simple average of beginning of year and end of year employment in the category.

Regarding the estimation of annual outmigration rates, we had hoped to get information from the Inter-county Migration Data Base System at Statistics Canada, but were unable to gain access to the data in time to include results in this report. Vanderkamp (1973, p. 15) presents interprovincial migration rates based on both five-year and one-year measurement, but the former are for 1956 to 1961 and the latter are for various years in the middle and late 1960's. The non-coincidence of time periods makes use of this data for our purpose hazardous. Further, there is no good reason to assume the relative sizes of five-year and one-year migration rates are the same for interprovincial as for intermunicipal migration. Finally, the 1971 census (Statistics Canada, 92-745, p. 36) reports a total of 1.5 million intermunicipal moves (assuming a mean of six for the open-ended category "five or more moves") were made in the five year period preceding the census date by the 2 million persons aged 5 years and over resident in British Columbia on the census date.

This yields an average annual outmigration rate of 15 percent. It should be noted that this includes an unknown amount of return migration. One indication of the possible size of return flow is that 5.4 percent of the persons we have defined as stayers (persons resident in the same municipality on both the 1966 and 1971 census dates) made intermunicipal moves in the intervening period. Indeed one percent of them made five or more such moves. The 15 percent estimate pertains to the province as a whole, and is not necessarily appropriate for what we have termed the "average area of interest", i.e., a "remote" area. The direction of bias is probably negative, in that five-year outmigration rates in our "areas of interest", previously estimated to be 38 percent, are higher than the average five-year outmigration rate for the province as a whole, which is 29 percent when estimated in a comparable manner. If we assume the proportionality between five-year and one-year rates is the same in the "areas of interest" and the province as a whole, the overall outmigration rate in the former areas is (38/29)15 = 19.7 percent per year or 98 percent over a five-year period. Lest this "large" number be confusing, we note that the interpretation is that over a five-year period there will be 98.3 persons moving out for every 100 persons resident in the area at any one point in time. Such a condition is consistent with even a very high stayer rate, as long as the "mover" group turns over rapidly enough.

One last assumption, and we can conclude this section. We have estimated the effect of a "basic change" in reception on the five-year outmigration rate as being in the range of 5 to 8 percent. We do not know the effect on the overall migration rate. We will deal with this by presenting results under two polar assumptions. ASSUMPTION I: the effect on the overall migration rate is of the same percentage magnitude as the effect on the five-year migration rate. ASSUMPTION II: the effect on migration other than that captured by the five-year rate is zero. The "truth" undoubtedly lies somewhere between these extremes. Intuitively, since "migration other than that captured by the five-year rate" consists of persons who "came and went" in the five-year interval, it will include a higher proportion of "mobility prone" persons than will the population resident on a given date.

Putting all of these assumptions together, we get Table 3. The final column in this table is derived by multiplying the fourth column times one-fifth of the second column and dividing by the first column, under ASSUMPTION I. Under ASSUMPTION II the same procedure is followed, except the result is multiplied by column 3 and divided by column 2.

It will be observed that part of the variation observed in the last column is due to the assumption regarding the level of the quit rate. If the quit rate is 35 percent, the most likely value for the effect of a "basic change" is a bit over two percent. If the quit rate is 45 percent, the most likely value is a bit less than two percent. In any event, for quit rates in this range it is unlikely that the effect is less than one percent or greater than four percent, accepting the numbers at face value.

Table 3: The Effect of a "Basic Change" in Reception on the Quit Rate under Varying Assumptions. (all numbers are percentages)

	(1) Quit Rate	(2) Overall Migration Rate	(3) 5-year Migration Rate	(4) Effect on 5-year Rate	(5) Effect on Quit Rate
ASSUMPTION I:	35	98	38	5	2.8
	35	98	38	8	4.5
	45	98	38	5	2.2
	45	98	38	8	3.5
	35	75	38	5	2.1
	35	75	38	8	3.4
	45	75	38	5	1.7
	45	75	38	8	2.7
ASSUMPTION II:	35	98	38	5	1.1
	35	98	38	8	1.7
	45	98	38	5	0.8
	45	98	38	8	1.4
	35	75	38	5	1.1
	35	75	38	8	1.7
	45	75	38	5	0.8
	45	75	38	8	1.4

VII. Costs of Turnover

It is generally desired that economic benefits be expressed in dollars, which in the case of turnover reduction implies obtaining an estimate of the "average cost of a quit". We did not undertake any large scale research project on the costing question, but did perform a literature search and an informal survey of personnel supervisors and other presumed experts in the area. The modal response from all sources was $1,000 per quit, with several qualifiers about why "no one really knows". We thus have no hard empirical results to report, but do have some observations on the subject which may prove useful to persons contemplating further work in the area.

First, for anyone contemplating survey work, personnel departments are the logical survey respondents. Unfortunately, high positional replacement costs are apparently viewed in some personnel departments as potential evidence of inefficiency in the department. This can lead to downward biased estimates of cost per replacement in survey responses.

Second, most of the models in the literature, e.g., Flamholtz (1973), ignore one possible employer response to turnover, usually termed "labour hoarding". This is defined as keeping more people on payroll than one really needed in order to avoid the "stockout costs" of running short-handed. The "extra" workers are usually assumed to be assigned to non-essential maintenance. It is very difficult to measure the costs of such activity.

Third, most models ignore or incompletely capture the effects of very basic changes in operations which may be due to the problem of attracting and holding workers in remote areas. For example, sawmilling is a weight-losing process, and transport cost considerations should dictate locating mills near the source of supply of logs. This may be uneconomical if labour turnover would be much higher in a mill near the source of supply than in one nearer to amenities. Again, this is a very difficult cost to measure. This is not a serious problem for the current application, since it appears changes in television reception have only marginal effects on turnover.

Finally, it may be worthwhile to note the obvious fact that recruitment costs are generally much higher in remote locations than in more urban areas, and the effect of reception on turnover costs is the product of two terms: the effect on turnover rates, previously estimated, and the effect on average cost per quit, which is not estimated. We may thus have a substantial underestimate of the effect of reception changes on total turnover costs. We are led to this speculation on the basis of intuition and the comments of some of the persons we talked to. One employer in the Vancouver area stated he had to hire "20 men every Monday morning", even with a stable level of operations. He noted that while this was a considerable bother and entailed costs, it was not really too serious because he had no trouble finding 20 men on Monday morning. The situation is different in remote areas where a seven side logging camp may only be running five sides due to inability to attract labour. Again the costs in terms of loss of scale economies are difficult to measure.

We made a very crude and unsuccessful attempt to measure the effects of reception on ability to attract labour. We regressed inmigration over the five-year intercensal period as a percentage of 1971 population in the area on the sets of independent variables found in Table 1. Since GROW is an independent variable, treated as exogenous, all we obtained was another estimate of population instability. Areas with poor reception have high inmigrant ratios. Some results of this attempt are reported in the next chapter under the latter interpretation. The relevant summary comment at this point is that we have no results substantiating the hypothesis that poor reception may increase the difficulty of attracting labour, nor have we devised a satisfactory means of testing this hypothesis.

CHAPTER 3

CRITIQUE AND SUGGESTIONS

This chapter has several purposes. It briefly presents results from some other relevant studies, discusses directions other than those previously reported which our research took and the results (more generally lack of results) which obtained, briefly summarizes and critiques our own results presented in Chapter 2, and discusses the fruitfulness of a number of potential directions for future research. While the previous chapter was concerned almost solely with turnover, the current chapter deals with economic benefits of improved reception more generally.

I. Other Studies

Horsfall, et. al. (1974) did an intensive study of the town of Port Alice, utilizing a personal interview technique. There are three points we wish to draw attention to in this study. First, the large number of factors potentially affecting how satisfied persons are with life in an isolated community treated in the Port Alice study emphasizes how partial our analysis of Chapter 2 has been. Second, some lessons on methodology for studying turnover are apparent. The comments on page 115 regarding the difficulty of performing follow-up interviews of persons who quit suggest the futility of this approach. The information from employer termination files presented in the section beginning on page 120 suggests this information is not very useful either, at least viewed in isolation. The largest single category of reasons for quitting (31.9 percent) is "Personal", and it is impossible to know what this includes.

Exit interview data have some value, and there are better and worse ways of conducting such interviews, but in our opinion little can be learned from such information unless identical interviews are conducted at several locations (at least two) over some period of time. Differences in the pattern of responses between locations may be meaningful, but the pattern in any one location viewed in isolation is not. Returning to a point made in Chapter 1, we suspect the reasons for quitting are made up of a complex combination of considerations which even the individual quitting does not know, and hence cannot explicate.

Finally, the Horsfall study makes brief reference to television reception (pp. 34-5, 142). In response to the question "Are you satisfied with TV and radio as they are in Port Alice?" only 2.6 percent of respondents answered in the positive. Yet 46.2 percent of respondents reported they spent 14 or more hours watching TV in the average week, and 84.5 percent indicated they would increase viewing hours given better reception, and 90 percent indicated they would increase viewing hours given better variety. "How much" better was apparently left to the respondents' subjective judgement. On the basis of these findings the authors conclude "reasonable" radio and television service should be provided, with some choice, i.e., "at least two stations/channels".

The report by Algar, et. al. (1974) deals with labour turnover at the Aluminum Company of Canada's Kitimat Works. It underscores the importance of employer attributes in any analysis of quit rates, thereby emphasizing the partiality of our analysis in Chapter 2. It contains no information on the effect of television reception, per se.

Bancroft (1975) presented information on a large number of categories of infrastructure in 18 mining communities in British Columbia. This report included estimates of turnover rates for the major employer in each community, and data on television reception in the form of a single variable, number of channels received. We experimented with a number of variables from this data base, using principal components analysis to shrink the independent variable set. The intent was (i) to examine the extent to which reception captures an influence distinct from other community attributes, a question of some importance since very few attributes were included in the equations in Chapter 2, and (ii) to examine the relationship between reception and turnover directly instead of by crude inference as was done in Chapter 2. Nothing useful emerged from this attempt for a number of reasons.

1. The sample size is much too small for the intended purpose.

2. Several of Bancroft's variables, particularly turnover rates, are rough approximations.

3. The results in equation 1a in Table 1 indicate number of channels is not a good measure of reception. Anderson's data (1973) could be matched to only 13 of the 18 observations, which made the sample size too small to be useful. We tried a dummy for communities with only one or two channels, but no useful results emerged.

4. Even accepting the turnover estimates at face value, we are interested in quit rates, not gross turnover rates.

5. Although Bancroft's data contain much information on community

attributes, they cannot be matched with employee attributes, and hence any analysis based on them is also partial.

Finally, a forthcoming study by Hoyt will hopefully yield useful information on the "reception effect" as well as other factors affecting turnover. Samples of persons employed by mining companies in seven different communities were extensively interviewed regarding their perceptions of both community and job-related factors, as well as objective information. When analyzed in conjunction with information from employer records, this data base will allow simultaneous estimation of the effects of community attributes (including television reception), employer attributes and worker attributes, obviating the necessity to make unrealistic assumptions regarding additivity and interactions as we did in Chapter 2.

There are a number of other studies regarding labour turnover (see, for example, the bibliography in MacMillan, et. al., 1974), none of them relating specifically to British Columbia. Still, it is surprising that the phenomenon has received so little attention and that so little is known about it. Logically, any study of the effects of television on turnover should be a minor extension to previous studies of turnover itself. We were severely handicapped in our attempt to look at the reception effect by the paucity of studies regarding turnover more generally, and lack of data on the phenomenon.

II. Other Empirical Results

As noted previously, we regressed inmigrants as a percentage of 1971 population, denoted PCTINM, on the sets of independent variables shown in

Table 1. Results from two variants are reported in Table 4. These results indicate that inmigration rates are higher where reception is worse, i.e., they show the effects on the other side of the turnover formula. They are not directly useful in estimating turnover costs, but do give some information about population stability. They are included here primarily because the denominator for the dependent variable does not contain the measurement errors potentially present in the denominator of PCTSTAY, yet statistical significance is generally present for the reception variables. No detailed analysis of these results was conducted, though a generalized pattern of sign reversals between equations 4a and b and the corresponding equations in Table 1 was noted. The main exception to this result is the variable GROW, which is strongly and positively related to both PCTSTAY and PCTINM.

There is an obvious specification error in equations 4a and b, in that since growth is measured in terms of population change, there is substantial reverse causation. This problem is probably not serious in the equations in Table 1, though it is still present. The obvious solution is to specify an additional equation using GROW as an independent variable, respecify the PCTINM equation and re-estimate the resulting three equation system simultaneously. This would entail obtaining additional variables affecting growth in order for the system to be identified. We forsee serious data problems in doing this, but it is a possibly fruitful direction for further research. (See MacMillan and Lu and bibliography therein regarding regional growth and development models).

Table 4: Supplementary Regression Results (t values in parentheses)

Eqn. No.	Dependent Variable	Intercept	BSTRCP	Channels Dummy C_1	Total Reception Dummies T_1 30<40	T_2 40<50	T_3 50<55	T_4 55+	PCTCOLOUR	PSWR	MUNW
4a	PCTINM	57.579	1.808	3.644						-0.027	0.020
		(6.08)	(2.86)	(3.00)						(-1.49)	(0.59)
4b	PCTINM	58.508			4.426	4.078	5.543	7.358		-0.015	-0.014
		(6.17)			(3.75)	(2.41)	(2.87)	(3.75)		(-0.81)	(-0.40)
4c	PCT3+	44.590			2.637	1.920	2.434	2.100		0.015	0.007
		(4.64)			(2.20)	(1.12)	(1.24)	(1.05)		(0.77)	(0.20)
4d	PCT5+	17.491			1.188	0.948	1.464	1.381		0.012	0.020
		(3.12)			(1.70)	(0.95)	(1.28)	(1.19)		(1.08)	(0.96)
4e	PCTSTAY	37.483							0.157	-0.053	0.055
		(3.86)							(2.27)	(-0.31)	(0.17)

Table 4 cont'd

Eqn. No.	MARR	EDUC	AGE	FOREST	MINE	MFG	FYRM	TEMP	PRECIP	SNOW	AVINCM
4a	0.218 (2.55)	-0.320 (-4.27)	0.327 (5.04)	0.228 (2.42)	0.083 (0.83)	-0.185 (-3.51)	-0.242 (-3.60)	-0.153 (-2.01)	0.015 (0.91)	-0.036 (-1.66)	0.073 (0.20)
4b	0.161 (1.85)	-0.279 (-3.65)	0.333 (5.02)	0.262 (2.70)	0.071 (0.70)	-0.179 (-3.28)	-0.266 (-3.82)	-0.072 (-0.82)	-0.002 (-0.14)	-0.022 (-0.99)	0.053 (0.14)
4c	-0.040) (-0.46)	-0.050 (-0.65)	0.319 (4.73)	-0.061 (-0.62)	0.079 (0.77)	-0.007 (-0.13)	0.011 (0.15)	-0.045 (-0.51)	-0.026 (-1.45)	-0.016 (-0.69)	-0.365 (-0.96)
4d	-0.020 (-0.38)	-0.021 (-0.47)	0.188 (4.79)	-0.014 (-0.25)	0.048 (0.81)	0.003 (0.10)	-0.110 (-2.67)	-0.014 (-0.27)	-0.022 (-2.10)	-0.011 (-0.85)	-0.296 (-1.34)
4e	-0.237 (-2.41)	0.244 (3.24)	-0.316 (-3.97)	-0.324 (-3.24)	-0.644 (-0.56)	0.187 (3.15)	0.274 (4.08)	0.029 (3.58)	-0.019 (-1.07)	0.014 (0.58)	-0.309 (-0.72)

Table 4 cont'd

Eqn. No.	AVINCF	M/F	NIND	OWNED	GROW	$\bar{R}^2$	S.E.E.	n
4a	-3.930 (-3.21)	1.959 (1.38)	-0.215 (-2.67)	-0.224 (-6.76)	0.179 (11.02)	.75	5.520	272
4b	-2.825 (-2.21)	1.787 (1.24)	-0.170 (-2.04)	-0.211 (-6.25)	0.185 (11.22)	.75	5.560	272
4c	-5.424 (-4.18)	4.230 (2.90)	0.035 (0.41)	-0.137 (-4.01)	-0.036 (-2.16)	.50	5.642	272
4d	-1.279 (-1.69)	4.103 (4.83)	0.030 (0.60)	-0.057 (-2.84)	-0.024 (-2.43)	.51	3.286	272
4e	3.150 (2.39)	-4.203 (-2.33)	0.155 (3.13)	0.190 (5.37)	0.226 (14.55)	.63	7.393	374

In an attempt to investigate further the question of population stability, we constructed variables representing the number of persons resident in an AA who had made three or more intermunicipal moves in the preceding five years as a percent of total inmigrants aged five years and over present in the AA as of the census date, and the same variable substituting those who had made five or more moves in the numerator. These are denoted PCT3+ and PCT5+, respectively. The results of regressing these variables on the set of independent variables did not produce any statistically significant coefficients for the reception variables, though the signs indicate highly mobile populations are more prevalent outside of Vancouver and Victoria. Interestingly, the presence of highly mobile persons in disproportionate numbers is negatively and significantly related to growth. Results for one variant of these equations are reported as 4c and d in Table 4. The only notable difference between the two equations is that the coefficient of FYRM is positive and insignificant in the PCT3+ equation and negative and significant in the PCT5+ equation. This is probably a reverse causation effect, in that persons who made five or more moves probably missed more than two weeks of work simply due to the moving activity.

We also did some work using a different variable to measure reception quality. This was the percentage of occupied dwellings which contained at least one colour television set, denoted PCTCOLOUR. This variable is obviously contaminated by income effects, but it seems reasonable to assume that persons in a given income class will be more likely to purchase a colour set in areas with good reception than in other areas. Since there may be some questions about the quality of Anderson's (1973) data (see Communications Canada, 1975, pp. 8-9) or the manner in which we have used these data, we report some summary results using PCTCOLOUR. It should be noted that we consider Anderson's data reliable enough for our purposes, and present the results on PCTCOLOUR only as supplemental information.

Our initial work with PCTCOLOUR, performed prior to obtaining the Area Aggregate data tapes from Statistics Canada, used data disaggregated to the Census Division (CD) level (29 observations) from the 1971 Census. A different set of independent variables was used in this initial work than in the equations reported in Chapter 2. These were (sources cited in bibliography):

MARR = percent of total 1971 population which was married.

FORMIN = percent of 1971 labour force engaged in forestry and mining.

SEC = percent of 1971 labour force engaged in manufacturing and construction.

MALE = percent of total 1971 population which was male.

AGE = percent of 1971 population over the age of 14 which was aged 20-34 years.

LT9 = percent of 1971 population over the age of 14, not attending school, which had an educational attainment of less than 9 years.

CHS = similar, educational attainment of completed high school.

UNIV = similar, educational attainment of some university or degree.

GROW = percentage change in population, 1966 to 1971 (1966 population by census division is published, and need not be estimated).

FARM = percent of 1971 population living on farms.

NIND = percent of 1971 population whose ethnic origin was native Indian.

OWNED = percent of occupied dwellings owned by occupants.

URB = percent of 1971 population living in urban areas.

TENPLUS = percent of 1971 population living in urban areas of 10,000 or more total population.

PRECIP = average annual rainful for some location near the center of the CD.

SNOW = similar, mean January temperature.

PCTCOLOUR = percent of occupied dwellings with at least one colour television set.

On the basis of this preliminary work, the set of independent variables used in the equations reported in Chapter 2 was selected, conditioned by applicability and data availability. Those variables which appeared unrelated to the dependent variable, PCTSTAY, in the preliminary work, e.g., CHS and UNIV, were not used in the work on the AA data base.

Results of this preliminary work are not presented here in detail (available from the authors on request), but in summary putting the 18 independent variables into a multiple regression with only 29 observations produced serious multicollinearity problems of complex types. The PCTCOLOUR variable was not as seriously affected by this as were most other variables, so the remaining 17 variables were run through a principal components analysis (using Varimax rotation) to shrink the independent variable set. Four components with eigenvalues in excess of unity were isolated. The first factor is not clearly identifiable, but appears to include all population characteristics excluding education. The second component is a climate factor, the third an education factor, and the fourth an urbanization factor.

These four factors were introduced into a multiple regression along with PCTCOLOUR, yielding an overall R^2 of 0.87 with t values exceeding 2 for all variables, with a coefficient for PCTCOLOUR of 0.75. Since it is unclear exactly what effects may be picked up by the PCTCOLOUR variable in addition to the intended "reception effect", we regressed PCTCOLOUR on four variables representing the percentage of dwellings with refrigerators, freezers, dishwashers and dryers, calling the residuals from this equation DEVCOLOUR. We regard this latter variable as representing colour set ownership corrected for income effects and any other effects peculiar to consumer durables ownership generally which may affect migration decisions. Curiously, colour television ownership is strongly and positively correlated with refrigerator ownership, less so with dishwashers, and essentially uncorrelated with freezers and dryers.

In any event, regressing PCTSTAY on the four factors from the principal components analysis previously discussed together with DEVCOLOUR yielded a coefficient for the latter variable of 0.70 with an associated t value of 1.65.

Since these results appeared encouraging, we also introduced PCTCOLOUR and DEVCOLOUR into regression equations using the AA data and all of the non-reception independent variables previously used in Chapter 2. The result for PCTCOLOUR is shown as equation 4e in Table 4. Since there was no need to reduce the sample, this equation is based on 374 observations, thus including all AA's in the province. The PCTCOLOUR coefficient has a significant t value and a magnitude of 0.157 (versus approximately 0.7 from the CD data). There is no theoretical reason for this radical change in coefficient magnitude. There may be some effect from aggregation bias, but we feel it is due largely to estimation technique differences and in some part to different independent variable sets.

Comparing the results for the non-reception variables in equation 4e with those in Table 1, it is noted that in equation 4e TEMP and NIND have become significant, the coefficient for AVINCM has changed sign, and the coefficient for AVINCF has increased substantially. On cursory examination these differences appear potentially explainable as collinearity effects, with the equations in Table 1 being the more reliable. Since we regard the results using PCTCOLOUR as supplementary only, we did not investigate in detail.

The means of PCTCOLOUR are 20 percent in AA's with TOTRCP codes less than 30, 22 percent where TOTRCP is between 30 and 40, 18 percent where TOTRCP is between 40 and 50, 17 percent where TOTRCP is between 50 and 55, and 12.5 percent where TOTRCP is greater than 55. (These estimates are based on the 272 observation sample.) We can thus get an estimate of the effect of reception changes on PCTSTAY if we consider, as in Chapter 2, a change such that TOTRCP changes from 55 plus to somewhere in the range of 50-55. This effect is (17-12.5) (0.157) = 0.7 percentage points. This estimate assumes, of course, that the proposed reception change would cause PCTCOLOUR to change by the observed difference in means in the sample data, a point commented upon below. In any event, this 0.7 percentage points estimate compares with an estimate of about 3 percentage points obtained in Chapter 2 (Table 2). The coefficient of PCTCOLOUR obtained from the CD data set of roughly 0.70, if applied to the observed difference in means provides an estimated effect of approximately 3 percentage points, compatible with the Table 2 estimate.

We also reran equation 4e with two versions of DEVCOLOUR substituted for PCTCOLOUR. The first of these used, as in the CD data, the residuals of PCTCOLOUR regressed on percent refrigerators, freezers, dishwashers, and dryers, and yielded a coefficient for DEVCOLOUR of 0.094 with a t value of 1.08. The second was similar, except that percent refrigerators was omitted, and yielded a coefficient for the revised DEVCOLOUR variable of 0.165 with a t value of 1.95. The results for the non-reception variables were similar to those obtained in equation 4e.

Finally, we investigated the relationship between PCTCOLOUR and the reception variables used in the equations in Table 1 (again using the 272 observation sample). The reception variables in equation 1b "explain" over 15 percent of the variations in PCTCOLOUR, those in equation 1c "explain" 14 percent, and those in equation 1e "explain" less than 12 percent. Using an F test, these are all statistically highly significant percentages, but it is obvious PCTCOLOUR includes very substantial variation other than that due to reception differences. Regressing

PCTCOLOUR on the reception variables included in equation 1c together with the variables measuring refrigerator, freezer, dishwasher and dryer ownership increase the R^2 to .70, and the partial F test on the reception variables given the appliance ownership variables yielded a value of 1.2, which is not significant. Repeating this substituting the reception variables used in equation 1e yielded an R^2 of 0.72, with a partial F for the reception variables of 4.6 which is significant.

In summary, the results regarding the PCTCOLOUR variable are, viewed in isolation, unstable and of unknown validity. We view these results as corroborative of the results in Chapter 2, in the sense that PCTSTAY is positively associated with the ownership of colour sets, and the latter is associated with the reception variables in the expected manner. The results regarding PCTCOLOUR are, however, in our opinion an inferior substitute for the results in Chapter 2.

We did some other empirical work, generally yielding negative findings. We subjected the non-reception variables used in the equations in Table 1 to principal components analysis, and obtained reasonably identifiable factors. Six components had eigenvalues exceeding unity, and one of these was clearly a climate component. However, when PCTSTAY was regressed on these six components and various sets of reception variables, the latter were not statistically significant and the R^2 were much lower than from the "ordinary" regression results, which did not occur with the CD data base. These findings do not invalidate the results discussed in Chapter 2, indeed they are weakly corroborative in that the reception variables had the expected signs and often had substantial t values. However, nothing new was learned from this exercise except that climate does appear to affect population stability.

We also performed many of the empirical estimations previously discussed on an reduced sample consisting of the 113 non-census-tract AA's in the 272 observation sample. We did not obtain any consistent results from this effort, either for the reception variables or for many of the other variables. This may be damaging to our results in Chapter 2, since the 113 observation sample is relatively free of the confounding of a number of community attributes regarding infrastructure with the reception variables. Our rationalization is twofold. First, attempting to measure an effect as small as the reception effect appears to be requires a large sample for empirical work, and 113 observations may be too small given the crudeness of the data, particularly the assumption that reception variables for the major community in an AA are applicable to the entire AA. Second, community attributes including television reception are interpretable and relevant only relative to feasible alternatives, and in British Columbia living in the Vancouver or Victoria area is certainly a feasible alternative to living in a more remote area. We had hoped to gain some insight regarding this point from the origin-destination data in Statistics Canada's Inter-county Migration Data Base System, but were unable to obtain access to the data in time to include any results in this report. Thus we feel the results from the 272 observation sample are more relevant than those from the non-census-tract sample. Someone may interject that a sample of 159 census tracts and 113 other AA's is too heavily weighted toward "urban" observations for a study primarily concerned with "remote" areas. Using the arguments above regarding feasible alternatives, and noting that AA's tend to be of approximately equal population sizes, the sample seems appropriate.

III. Case Study

In the initial proposal for this study, we stated we would attempt personal interview work in some community which had recently experienced an improvement in television reception, a natural experiment of the "before-after" variety. We expended considerable effort in this direction, with negative results. We report some of the chronology involving this attempt not as a means of rationalizing our failure to perform an analysis we stated an intent to perform, but because it contains some important methodological lessons for future research work.

Our methodology consisted of obtaining from Communications Canada a list of communities which had experienced substantial changes in television reception at some time in the early 1970's. We then selected locations on a serial basis starting with communities which were relatively remote but accessible for interviewers and contacted senior officials in the company representing the major employer in the area. Given this entree we were then referred to a personnel supervisor or accountant from whom we requested data on quit rates covering a period of years including a couple of years before and after the reception change. We found that the employers we contacted were unable to provide these data. They could, of course, obtain total separation rates from payroll records, but had no record on cause of separation. For the last couple of years the Unemployment Insurance Commission has required that records be kept on cause of termination, but this was apparently not the case previously.

We started out on this with a rather "purist" attitude, seeking an employer with operations in several (at least two) locations, one of which had experienced a change in reception while the other(s) had not. We further wanted to minimize the confounding effect of other changes in community or employer attributes. The employer could not provide quit rate data for the one "ideal" experiment (though there were several confounding influences) we isolated.

We "lowered our sights" and contacted employers in other locations, but were still unable to obtain quit rate data. We considered using gross separation rate data and adjusting this for layoffs and other separations, but since the communities we were looking at were primarily associated with the forest products industry, which has been operating at a low level for the last couple of years, this did not appear practical. We could have performed interview work in communities which had experienced reception changes without concerning ourselves with quit rate changes, or we could probably have obtained quit rates for operations in communities which had not experienced reception changes, but did not see much value in this since Hoyt's forthcoming study will probably provide more information of this type than we had the time or the resources to generate. Finally we simply "used up" our time frame in series negotiations which never yielded the desired results.

On the basis of this experience and information gained from various contacts, we would now make the following points.

1. Nothing of an empirical nature that will allow quantitative estimation of the effect of reception changes on turnover can be learned from "before-after" experiments.

2. Subjective impressions can of course be collected. On the basis of the impressions of persons we contacted, the effect is positive, small, tends to deteriorate over time, and is always confounded with other influences.

3. A much more fruitful approach would be a cross section analysis, starting with a mail questionnaire to selected employers to obtain quit rates for the most recent completed calendar year, a la MacMillan, et. al. On the basis of returns to this survey, conduct follow-up interviews of employers and some sample of community residents to obtain information on possible reasons for the level of quit rates in the community. Such a procedure would provide useful complementary information for the estimates we presented in Chapter 2, particularly if it includes an attempt to more precisely estimate the cost of a quit.

IV. Alcoholism

Alcoholism is a serious social problem in British Columbia (see B.C., Alcohol and Drug Commission, 1974) involving very substantial economic costs in the form of employee absenteeism, traffic accidents, and use of health and police services. Some persons have advanced the hypothesis that alcohol use and particularly abuse is often high in "remote areas" because of lack of alternative activities, and hence that improved television reception _may_ reduce alcoholism problems.

Our a priori judgement is that such an effect, if it exists, will be small and very difficult to isolate, and it is even possible that television viewing and alcohol consumption are complementary activites. Still the costs of alcoholism are so high that even a small positive reception effect may yield substantial benefits. Thus we feel the hypothesis merits some cursory examination, though it certainly does not at present merit a large scale study.

Data on sales of alcoholic beverages by geographical area have been published by the provincial government (data for 1969-1972 are summarized in B.C. Department of Industrial Development..., pp. 134-136) for a number of years, in value terms. Recognizing that alcohol use and alcohol abuse are not the same thing, and need not necessarily even be highly correlated, we still felt some cursory examination of this data would yield useful preliminary information. The intent was to examine alcohol consumption in volume terms per capita cross-sectionally and particularly with regard to differential changes over time in different areas. If this yielded "interesting" differences, then we intended to look at gross comparisons with television reception and changes in reception over time.

To do this, one needs volume data, or failing that, a price index for use in deflating the value data. Since all sales in British Columbia are through the Liquor Control Board and price changes are discrete and province wide, a price index utilizing constant weights is reasonably easy to construct. Of course, constant weights may be unrealistic, in that the mix of beer versus wine versus spirits probably differs from area to area, and possibly also over time.

We thus wrote to the Attorney General's Department about two months ago requesting volume data, if available, or failing that specified information useful in constructing a price index. We had at the time of writing received no reply, and hence have no results to report.

V. Critique and Summary

The inadequacies of our study are hopefully reasonably clear, as we have attempted to detail difficulties as we perceived them, and have reported at least in general terms our negative as well as positive findings. Although we began the project with the subjective view that reception quality did have a positive albeit small effect on turnover and population stability, and it is impossible (and probably undesirable) for anyone to be so "scientific" that they can completely ignore prior subjective judgements when performing empirical work, we do not feel we have "cooked" the results. We could, for example, have improved the statistical significance of the reception variables by dropping selected non-reception variables from the estimations, which we avoided in an attempt to minimize bias due to prior judgements.

The quality of the data utilized, in the sense of applicability as opposed to magnitude of sampling error, is certainly open to question. One can rationalize by noting that it appears to be the "best data available", and further that it is at least as good as is used in empirical work generally. Further, we have been at pains to document data sources and the various manipulations performed on this data (indeed have presented the observations in the Appendix) so that the results can be replicated by others and various changes in specification and estimation techniques made as desired.

Accepting the results at face value, precisely what have we learned? In point form:

1. Changes in reception appear to have a substantial effect on the five-year outmigration rate, and hence on population stability. Our numerical estimate of this effect is in the range of 5 to 7 percent for a "basic change" in a "remote area". These estimates are of course valid only under the assumptions given, but form a basis for estimating a number of economic benefits, aside from the effect on turnover, which we would categorize under the general term "growth and development".

2. We have a numerical estimate of the effect of a "basic change" in reception on the quit rate in areas of a specified type, i.e., 1 to 4 percent. This estimate derives from the estimate of the outmigration effect, and hence includes all errors present in the latter. In addition, it includes errors due to the crude assumptions we had to make in the absence of hard quit rate data.

3. The main conclusion regarding turnover rates is that some data should be collected on the phenomenon. It is not clear in our opinion that this is or should be the responsibility of the Department of Communications.

4. A modest further effort on the alcoholism question appears warranted.

5. Further research on estimating the "growth" effects of greater population stability appears warranted. Hopefully this can be structured in such a manner that benefits of improved reception in increasing ability to attract workers to remote areas can be isolated.

6. More work is required in the area of estimating the average cost of a quit. It is again not clear that this is the responsibility of the Department of Communications.

7. Interview work is very useful in checking empirical results, in that numbers alone can yield ridiculous results. However, given Hoyt's forthcoming study and the apparent limitations on what information can be obtained by interview, this does not appear to be a high priority direction of research at the present time. Additional anecdotal information can provide "political leverage", but will not add much to the understanding of phenomena.

In sum, we have not learned much we didn't suspect at the outset, though we have increased our degree of belief in some propositions. This may seem a disappointingly small step forward, but on the other hand "qui niminum probat, nihil probat".

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Appendix A

Since the source data underlying the regression estimates in Table 1 in the text are not available in published form, this appendix presents the raw observations used. The observations are numbered from 1 to 272 in the first column on the following pages, and these represent Area Aggregates in the sequence numbers were assigned to them by Statistics Canada (see Area Aggregate Official List, 1971 Census, Series 1, Part 4d, Western Provinces), from which the following 102 AA's have been deleted, preserving the order of the remaining observations.

8004
8009
8015-8017
8020-8021
8023-8024
8026
8097-8138
8187
8190
8203-8204
8207
8240
8245-8246
8250
8270-8272
8278-8291
8300
8312
8325-8332
8339
8343
8345
8358-8360
8362-8363
8384
8388
8391
8397-8399

A crude identification of observations with geographical areas is provided on the following pages.

Observations	Geographical Area
1	Fernie
2 - 3	Cranbrook
4	Creston
5	Salmo
6	Fruitvale - Montrose
7 - 8	Trail
9	Grand Forks
10	Greenwood - Midway
11	Keremeos
12	Princeton
13	Hope
14	Chilliwack
15	Harrison Hot Springs
16	Mission
17	Abbotsford
18 - 87	Vancouver
88 - 100	Surrey
101 - 111	New Westminster
112 - 135	Burnaby
136	Lions Bay
137	Port Moody
138 - 145	Coquitlam
146 - 148	Port Coquitlam
149	Haney
150 - 151	Langley

Observations	Geographical Area
152 - 153	Victoria
154	Gibsons Landing
155	Sechelt
156 - 159	Nanaimo
160	Ladysmith
161	Chemainus
162	Duncan
163 - 186	Victoria
187	Lake Cowichan
188	Ucluelet - Tofino
189	Port Hardy - Port McNeill - Port Alice
190	Sayward
191	Gold River - Tahsis
192 - 194	Campbell River
195 - 198	Port Alberni
199	Zeballos - Parksville - Qualicum Beach
200	Cumberland
201 - 202	Courtenay
203	Comox
204 - 205	Powell River
206	Squamish
207	Pemberton - Lytton
208	100 Mile House - Lillooet
209	Cache Creek
210	Ashcroft
211	Merritt

Observations	Geographical Area
212	Peachland
213	Summerland
214	Oliver - Osoyoos
215 - 217	Penticton
218	Nakusp
219	Castlegar
220	Kinnaird
221 - 222	Nelson
223	Kaslo
224	Kimberley
225	Sparwood - Invermere
226	Golden
227	Revelstoke
228 - 230	Vernon
231	Enderby
232	Salmon Arm
233	Chase
234 - 239	Kamloops
240	Williams Lake
241	Ocean Falls
242 - 245	Prince Rupert
246 - 247	Kitimat
248	Houston
249	Fraser Lake
250 - 258	Prince George

Observations	Geographical Area
259	Valemount
260	Quesnel
261 - 263	Dawson Creek
264 - 265	Fort St. John
266	Hudson's Hope - Chetwynd
267	Mackenzie
268	Fort St. James - Vanderhoof
269	Burns Lake
270	Smithers
271	Hazelton - Cassiar
272	Quesnel

SOURCE DATA FOR TABLE 1

	STAYR	NCHANN	BSTRCP	TOTRCP	PSWR	MUNW
1	70.1	5.0	2.0	44.5	55.9	68.6
2	67.5	7.0	2.0	41.3	91.6	96.4
3	71.5	7.0	2.0	41.8	49.0	64.1
4	65.9	5.0	1.0	40.0	47.2	89.8
5	59.2	4.0	2.0	46.0	1.7	43.0
6	73.1	5.0	3.2	48.0	67.1	92.2
7	60.1	5.0	3.0	46.0	98.4	98.4
8	82.9	5.0	3.0	46.0	97.7	98.0
9	71.5	4.0	2.0	51.2	41.3	55.4
10	67.1	3.5	3.0	53.7	1.0	44.0
11	73.9	1.0	3.0	57.0	1.3	57.2
12	48.6	2.0	2.0	54.0	58.0	64.6
13	57.5	2.0	3.0	55.4	26.5	79.1
14	61.0	6.0	2.0	39.0	95.3	98.1
15	67.9	2.0	4.0	56.6	2.5	31.4
16	71.0	4.0	2.5	48.0	46.5	81.9
17	64.0	9.0	1.7	28.5	53.3	83.2
18	70.9	8.0	1.3	28.0	1.2	27.6
19	38.9	8.0	1.3	28.0	0.0	100.0
20	83.5	8.0	1.3	28.0	98.8	99.8
21	74.8	8.0	1.3	28.0	99.1	99.7
22	74.4	8.0	1.3	28.0	99.2	99.7
23	59.0	8.0	1.3	28.0	99.7	99.8
24	74.6	8.0	1.3	28.0	99.2	99.6
25	74.8	8.0	1.3	28.0	96.9	99.8
26	80.6	8.0	1.3	28.0	91.1	100.0
27	73.8	8.0	1.3	28.0	99.3	99.5
28	87.1	8.0	1.3	28.0	99.8	99.8
29	77.8	8.0	1.3	28.0	99.2	99.6
30	76.5	8.0	1.3	28.0	99.5	100.0
31	87.2	8.0	1.3	28.0	99.5	100.0
32	77.7	8.0	1.3	28.0	99.2	100.0
33	86.0	8.0	1.3	28.0	99.7	100.0
34	76.2	8.0	1.3	28.0	98.9	99.5
35	76.9	8.0	1.3	28.0	99.1	99.3
36	77.3	8.0	1.3	28.0	99.7	100.0
37	75.6	8.0	1.3	28.0	98.7	99.7
38	89.9	8.0	1.3	28.0	99.2	100.0
39	72.3	8.0	1.3	28.0	99.6	99.6
40	71.7	8.0	1.3	28.0	100.0	100.0
41	74.5	8.0	1.3	28.0	100.0	100.0
42	73.4	8.0	1.3	28.0	100.0	100.0
43	74.9	8.0	1.3	28.0	99.8	100.0
44	76.5	8.0	1.3	28.0	100.0	100.0
45	82.1	8.0	1.3	28.0	100.0	100.0
46	69.5	8.0	1.3	28.0	98.4	99.2

SOURCE DATA FOR TABLE 1 (CONTD.)

	STAYR	NCHANN	BSTRCP	TOTRCP	PSWR	MUNW
47	69.4	8.0	1.3	28.0	98.9	99.2
48	75.8	8.0	1.3	28.0	99.4	100.0
49	71.2	8.0	1.3	28.0	98.7	99.4
50	70.2	8.0	1.3	28.0	98.0	98.3
51	74.4	8.0	1.3	28.0	100.0	100.0
52	75.1	8.0	1.3	28.0	98.6	99.2
53	76.3	8.0	1.3	28.0	98.6	99.8
54	81.0	8.0	1.3	28.0	99.1	99.6
55	66.8	8.0	1.3	28.0	98.4	99.0
56	66.5	8.0	1.3	28.0	99.1	99.7
57	59.0	8.0	1.3	28.0	97.8	97.9
58	68.9	8.0	1.3	28.0	99.2	99.5
59	71.8	8.0	1.3	28.0	97.7	98.3
60	72.3	8.0	1.3	28.0	99.7	99.7
61	69.5	8.0	1.3	28.0	99.8	99.8
62	58.3	8.0	1.3	28.0	98.3	100.0
63	63.7	8.0	1.3	28.0	97.9	97.9
64	61.8	8.0	1.3	28.0	98.3	98.5
65	64.9	8.0	1.3	28.0	99.4	99.4
66	55.7	8.0	1.3	28.0	98.2	98.7
67	46.3	8.0	1.3	28.0	96.5	97.8
68	74.1	8.0	1.3	28.0	97.6	98.7
69	78.7	8.0	1.3	28.0	98.0	98.7
70	79.3	8.0	1.3	28.0	98.4	99.3
71	76.6	8.0	1.3	28.0	99.2	99.6
72	74.9	8.0	1.3	28.0	99.2	99.8
73	85.7	8.0	1.3	28.0	98.9	99.4
74	71.2	8.0	1.3	28.0	97.9	98.8
75	76.7	8.0	1.3	28.0	97.1	98.0
76	55.1	8.0	1.3	28.0	100.0	100.0
77	55.8	8.0	1.3	28.0	94.9	95.3
78	61.7	8.0	1.3	28.0	99.2	99.7
79	49.5	8.0	1.3	28.0	99.7	100.0
80	69.7	8.0	1.3	28.0	99.1	99.3
81	54.2	8.0	1.3	28.0	97.3	98.1
82	59.8	8.0	1.3	28.0	98.1	98.7
83	58.9	8.0	1.3	28.0	98.5	98.6
84	52.5	8.0	1.3	28.0	98.0	98.6
85	62.0	8.0	1.3	28.0	98.0	98.2
86	70.8	8.0	1.3	28.0	99.2	99.7
87	52.0	8.0	1.3	28.0	99.5	100.0
88	72.2	8.0	2.0	31.2	2.4	56.9
89	68.0	8.0	2.0	31.2	2.0	97.7
90	73.5	8.0	2.0	31.2	1.1	34.5
91	75.9	8.0	2.0	31.2	36.8	83.3
92	80.9	8.0	2.0	31.2	2.8	91.7

	ST4YR	NCHANN	BSTRCP	TOTRCP	PSWR	MUNW
93	69.0	8.0	2.0	31.2	6.4	97.8
94	73.7	8.0	2.0	31.2	53.2	99.3
95	74.1	8.0	2.0	31.2	1.3	87.4
96	70.3	8.0	2.0	31.2	0.9	27.0
97	74.2	8.0	2.0	31.2	68.5	98.2
98	69.3	8.0	2.0	31.2	66.7	98.8
99	71.2	8.0	2.0	31.2	77.3	99.3
100	6[illegible].8	8.0	2.0	31.2	9.4	96.2
101	68.7	9.9	2.3	31.3	0.8	97.0
102	75.1	9.9	2.3	31.3	12.3	99.1
103	41.6	9.9	2.3	31.3	97.6	100.0
104	70.9	9.9	2.3	31.3	100.0	100.0
105	71.5	9.9	2.3	31.3	98.7	99.1
106	67.1	9.9	2.3	31.3	98.7	99.2
107	47.7	9.9	2.3	31.3	99.0	99.0
108	40.1	9.9	2.3	31.3	95.5	95.5
109	65.6	9.9	2.3	31.3	99.2	99.2
110	69.8	9.9	2.3	31.3	100.0	100.0
111	64.0	9.9	2.3	31.3	99.1	99.7
112	59.3	7.0	1.0	36.9	15.7	100.0
113	75.6	7.0	1.0	36.9	98.7	100.0
114	70.6	7.0	1.0	36.9	95.1	100.0
115	68.7	7.0	1.0	36.9	97.5	99.7
116	81.1	7.0	1.0	36.9	99.5	100.0
117	72.6	7.0	1.0	36.9	96.3	99.8
118	75.5	7.0	1.0	36.9	98.6	99.8
119	77.2	7.0	1.0	36.9	99.4	99.6
120	66.5	7.0	1.0	36.9	99.0	100.0
121	68.9	7.0	1.0	36.9	96.5	100.0
122	61.5	7.0	1.0	36.9	90.6	99.6
123	82.1	7.0	1.0	36.9	93.9	98.7
124	84.8	7.0	1.0	36.9	91.5	100.0
125	68.9	7.0	1.0	36.9	99.1	100.0
126	68.5	7.0	1.0	36.9	89.8	100.0
127	77.7	7.0	1.[illegible]	36.9	86.1	100.0
128	85.1	7.0	1.0	36.9	87.7	99.2
129	80.1	7.0	1.0	36.9	85.1	99.3
130	80.7	7.0	1.0	36.9	96.3	99.8
131	73.7	7.0	1.0	36.9	97.4	100.0
132	67.8	7.0	1.0	36.9	98.5	99.8
133	69.6	7.0	1.0	36.9	99.3	100.0
134	71.7	7.0	1.0	36.9	95.3	99.7
135	81.2	7.0	1.0	36.9	91.0	99.0
136	92.1	2.0	3.0	55.0	0.0	88.0
137	60.1	8.0	1.0	30.4	97.8	99.8
138	66.2	8.0	2.0	33.6	100.0	100.0

SOURCE DATA FOR TABLE I (CONTD.)

	STAYR	NCHANN	BSTRCP	TCTRCP	PSWR	MUNW
139	74.3	8.0	2.0	33.6	84.8	99.2
140	70.6	8.0	2.0	33.6	95.7	100.0
141	68.0	8.0	2.0	33.6	97.2	98.9
142	82.3	8.0	2.0	33.6	98.1	100.0
143	79.1	8.0	2.0	33.6	96.4	100.0
144	74.6	8.0	2.0	33.6	89.8	99.5
145	76.7	8.0	2.0	33.6	4.7	69.8
146	68.3	8.0	2.0	31.2	88.6	99.8
147	79.0	8.0	2.0	31.2	97.0	99.6
148	70.5	8.0	2.0	31.2	83.0	99.5
149	71.4	8.0	2.0	31.2	42.2	84.0
150	70.9	8.0	1.5	28.8	60.4	90.6
151	71.5	8.0	1.5	28.8	5.3	14.1
152	66.6	9.9	1.0	13.5	99.2	99.6
153	69.1	9.9	1.0	13.5	98.5	99.4
154	66.5	8.0	2.0	32.8	5.4	70.1
155	62.8	7.0	2.0	36.2	5.0	68.9
156	51.5	9.0	1.8	30.3	69.8	93.7
157	46.3	9.0	1.8	30.3	88.0	96.4
158	59.9	9.0	1.8	30.3	83.1	88.8
159	53.2	9.0	1.8	30.3	96.0	97.7
160	66.7	7.0	3.0	45.3	62.5	82.8
161	86.3	9.0	2.5	37.5	45.0	77.2
162	59.9	9.0	1.2	28.5	77.3	87.2
163	66.2	9.9	1.0	13.5	98.9	98.9
164	71.7	9.9	1.0	13.5	97.1	97.8
165	73.9	9.9	1.0	13.5	99.0	99.0
166	68.7	9.9	1.0	13.5	98.3	99.4
167	80.4	9.9	1.0	13.5	98.3	99.4
168	62.6	9.9	1.0	13.5	97.5	98.8
169	71.4	9.9	1.0	13.5	97.8	98.7
170	56.7	9.9	1.0	13.5	97.7	98.0
171	68.1	9.9	1.0	13.5	99.1	100.0
172	60.6	9.9	1.0	13.5	99.4	99.4
173	71.2	9.9	1.0	13.5	99.3	99.3
174	71.2	9.9	1.0	13.5	99.2	99.6
175	72.0	9.9	1.0	13.5	97.5	100.0
176	70.7	9.9	1.0	13.5	98.6	100.0
177	71.6	9.9	1.0	13.5	99.8	100.0
178	72.6	9.9	1.0	13.5	98.9	100.0
179	73.6	9.9	1.0	13.5	98.9	99.5
180	59.8	9.9	1.0	13.5	98.2	99.7
181	64.6	9.9	1.0	13.5	95.4	98.9
182	79.1	9.9	1.0	13.5	99.5	100.0
183	77.0	9.9	1.0	13.5	91.8	100.0
184	73.5	9.9	1.0	13.5	99.1	100.0

	STAYR	NCHANN	BSTRCP	TOTRCP	PSWR	MUNW
185	73.2	9.9	1.0	13.5	95.7	99.5
186	58.6	9.9	1.0	13.5	81.9	98.8
187	62.2	6.0	1.4	39.0	10.5	66.6
188	46.7	3.0	3.6	54.6	17.2	62.8
189	35.6	1.7	3.7	56.4	59.5	81.3
190	46.3	3.0	2.6	54.3	36.3	54.6
191	27.5	1.0	4.7	58.7	78.7	96.5
192	43.6	7.0	1.2	36.2	1.0	57.7
193	93.9	7.0	1.2	36.2	10.7	96.2
194	56.8	7.0	1.2	36.2	82.5	89.8
195	69.6	5.0	2.0	43.5	86.1	97.5
196	83.5	5.0	2.0	43.5	97.3	98.5
197	77.5	5.0	2.0	43.5	91.4	97.9
198	81.2	5.0	2.0	43.5	48.5	97.6
199	70.3	4.3	3.5	53.6	21.1	64.0
200	61.0	9.0	2.0	32.1	26.6	77.9
201	45.7	8.0	2.0	32.8	68.0	89.4
202	49.7	8.0	2.0	32.8	31.2	49.7
203	46.7	8.0	2.0	32.0	80.9	84.1
204	93.2	7.0	2.0	39.0	66.5	83.4
205	61.3	7.0	2.0	39.0	74.8	92.0
206	60.7	5.0	3.0	45.5	31.7	89.9
207	44.5	1.0	3.5	57.5	19.7	54.2
208	50.5	1.5	3.8	56.7	40.4	64.9
209	62.1	0.0	6.0	60.0	26.0	35.9
210	58.3	1.0	4.5	58.5	28.9	81.9
211	63.7	6.0	2.0	40.8	64.0	86.8
212	70.9	2.0	2.5	54.6	9.0	66.7
213	70.1	5.0	2.0	44.0	1.6	89.9
214	47.5	5.0	2.5	45.0	66.4	78.6
215	77.9	5.0	1.0	42.0	67.4	94.0
216	61.0	5.0	1.0	42.0	99.1	99.8
217	62.3	5.0	1.0	42.0	74.4	96.9
218	51.7	2.0	2.8	55.2	2.7	56.5
219	48.5	4.0	2.0	46.4	66.2	92.2
220	56.3	4.0	2.0	46.4	8.3	58.7
221	53.1	4.0	2.0	45.2	96.6	98.3
222	78.0	4.0	2.0	45.2	88.2	89.8
223	48.1	1.0	3.3	57.3	1.3	59.6
224	76.0	4.0	2.0	46.0	97.2	98.4
225	51.9	3.0	2.9	52.2	30.9	67.7
226	65.8	2.0	4.0	57.0	37.3	58.2
227	64.7	2.0	3.0	55.0	83.1	97.4
228	72.8	2.0	2.3	53.4	72.2	85.3
229	60.0	2.0	2.3	53.4	74.4	88.2
230	79.9	2.0	2.3	53.4	44.3	64.9

SOURCE DATA FOR TABLE 1 (CONTD.)

	STAYR	NCHANN	BSTRCP	TCTRCP	PSWR	MUNW
231	59.6	2.0	2.0	53.0	47.3	72.1
232	64.1	1.0	2.0	56.0	23.0	81.1
233	70.1	2.0	3.0	54.0	1.0	29.8
234	68.6	2.0	1.3	51.4	88.4	92.2
235	61.8	2.0	1.3	51.4	90.5	93.8
236	59.6	2.0	1.3	51.4	89.8	96.9
237	53.2	2.0	1.3	51.4	97.2	97.8
238	53.8	2.0	1.3	51.4	96.2	98.6
239	80.3	2.0	1.3	51.4	61.7	97.5
240	50.5	1.0	4.0	58.0	71.1	83.9
241	46.7	1.0	5.0	59.0	54.7	91.9
242	60.0	1.0	3.0	57.0	75.0	85.4
243	60.6	1.0	3.0	57.0	89.3	97.3
244	45.3	1.0	3.0	57.0	70.4	88.9
245	68.1	1.0	3.0	57.0	82.0	88.8
246	74.6	1.0	2.4	56.4	95.8	96.3
247	60.2	1.0	2.4	56.4	99.3	99.3
248	54.1	1.0	3.3	57.3	63.4	71.0
249	47.0	1.0	2.0	56.0	30.1	36.0
250	61.0	1.0	1.4	55.4	70.0	95.6
251	70.6	1.0	1.4	55.4	31.8	67.0
252	69.0	1.0	1.4	55.4	34.3	60.1
253	76.2	1.0	1.4	55.4	99.0	99.0
254	53.1	1.0	1.4	55.4	21.5	79.7
255	35.6	1.0	1.4	55.4	98.9	100.0
256	58.5	1.0	1.4	55.4	97.2	99.7
257	43.5	1.0	1.4	55.4	56.0	79.1
258	52.2	1.0	1.4	55.4	94.6	99.7
259	56.0	1.0	4.0	58.0	1.5	22.2
260	61.7	2.0	3.5	55.0	44.8	51.9
261	60.5	3.0	2.6	52.5	71.8	78.0
262	60.6	3.0	2.6	52.5	71.7	75.1
263	68.6	3.0	2.6	52.5	81.4	82.8
264	70.5	1.0	2.3	56.3	67.0	77.9
265	52.5	1.0	2.3	56.3	77.4	83.4
266	42.4	1.0	3.5	57.5	43.8	51.0
267	57.1	1.0	3.4	57.4	39.1	59.0
268	65.3	1.0	3.7	57.6	45.0	50.6
269	64.8	1.0	3.0	57.0	29.1	36.9
270	69.8	1.0	3.3	57.3	52.6	64.3
271	48.4	1.0	2.9	56.9	31.8	63.0
272	61.9	2.0	3.5	55.0	45.8	52.5

SOURCE DATA FOR TABLE I

	MARR	EDUC	AGE	FOREST	MINE	MFG
1	69.0	29.9	34.1	6.76	15.05	15.05
2	68.9	18.2	33.0	1.46	2.10	13.27
3	66.4	28.7	34.8	4.64	3.78	11.51
4	68.8	35.8	20.6	3.61	1.20	17.07
5	71.0	38.6	30.2	4.27	19.09	22.79
6	74.6	23.0	29.6	0.93	3.94	41.30
7	64.5	24.3	23.3	0.38	7.28	32.38
8	67.4	31.0	28.2	0.22	7.54	39.01
9	68.2	44.2	24.8	3.23	5.54	18.94
10	71.1	30.4	22.9	4.44	6.17	15.56
11	66.8	37.9	18.9	1.37	3.65	7.08
12	67.6	29.9	30.6	6.04	10.76	11.55
13	67.9	28.7	30.3	10.27	7.76	4.61
14	63.7	35.0	21.6	4.13	0.49	9.22
15	61.6	35.0	25.1	6.34	0.42	5.71
16	66.2	32.5	25.1	6.07	0.37	17.10
17	64.8	29.4	26.2	1.00	0.0	11.60
18	68.2	31.6	26.8	0.79	0.26	11.38
19	75.0	37.5	25.0	0.0	0.0	20.00
20	64.4	19.5	24.5	0.71	0.36	19.52
21	63.9	29.8	29.3	0.40	0.20	23.48
22	65.7	28.8	27.1	0.88	0.53	24.43
23	62.6	13.3	51.7	0.96	0.48	14.58
24	62.3	18.2	24.5	0.73	0.44	18.14
25	64.1	9.8	19.8	0.47	0.63	11.34
26	66.6	4.5	21.9	0.87	1.45	9.59
27	59.5	8.3	19.6	0.33	0.49	8.55
28	64.6	11.7	19.1	0.53	1.20	9.57
29	65.4	32.6	26.3	0.57	0.57	22.79
30	62.5	30.2	24.1	0.52	1.20	18.59
31	63.6	32.6	25.4	0.98	0.55	23.25
32	66.2	31.2	26.3	0.41	0.20	21.88
33	63.4	24.0	20.9	0.60	0.36	19.83
34	65.5	29.1	26.1	0.13	0.40	18.86
35	64.9	30.2	26.4	0.51	0.64	20.38
36	67.5	32.1	26.8	0.36	0.12	23.22
37	58.0	26.0	23.7	0.48	0.24	14.83
38	53.8	12.9	17.1	0.48	0.48	11.06
39	56.6	7.1	22.0	0.49	1.23	10.10
40	52.9	11.3	17.2	1.44	1.08	8.66
41	65.5	7.8	24.8	0.57	0.85	11.93
42	65.9	7.8	24.7	1.61	0.81	9.27
43	61.8	11.5	24.3	1.16	1.98	10.74
44	65.3	13.8	22.0	1.47	0.25	9.34
45	64.3	7.4	17.8	0.34	1.03	12.07
46	52.0	12.1	24.7	0.56	1.98	13.28

	MARR	EDUC	AGE	FOREST	MINE	MFG
47	54.6	22.2	27.0	0.55	0.73	14.29
48	63.7	30.4	29.0	0.60	0.0	19.28
49	58.8	28.9	30.3	1.06	0.47	17.20
50	62.1	32.2	30.8	0.0	0.40	19.80
51	64.8	31.8	28.2	0.78	0.0	19.81
52	62.4	36.7	29.7	0.72	0.29	23.12
53	64.6	34.1	25.3	0.61	0.15	20.06
54	67.3	30.7	26.0	0.58	0.58	20.68
55	61.9	35.9	34.3	0.44	0.74	19.56
56	55.1	28.4	40.5	0.51	1.02	16.33
57	48.2	20.8	40.1	0.31	0.51	12.69
58	44.9	15.9	37.9	0.09	1.12	8.09
59	45.4	21.0	30.6	0.80	0.27	12.10
60	58.2	17.2	28.0	0.39	0.59	11.98
61	56.5	10.4	28.6	0.73	1.31	10.89
62	60.3	6.5	29.7	0.68	1.36	10.45
63	54.1	16.8	40.6	0.41	0.41	10.12
64	5[illegible].7	17.6	52.9	0.92	0.92	11.58
65	49.4	10.2	54.8	0.67	1.64	9.92
66	48.5	16.3	44.5	0.76	1.33	10.65
67	45.8	34.1	37.7	1.45	1.45	10.91
68	59.0	32.8	40.5	1.15	0.35	19.52
69	66.0	38.5	26.5	0.34	1.02	19.93
70	65.3	35.9	26.1	1.10	0.14	22.94
71	63.6	35.7	25.5	0.66	0.0	17.08
72	63.5	42.2	28.6	0.27	0.53	20.69
73	61.0	37.2	36.2	0.74	0.62	21.14
74	56.4	43.4	31.5	0.87	0.72	22.03
75	50.5	60.9	19.3	0.54	0.72	18.17
76	4[illegible].8	63.1	12.5	1.19	1.19	10.12
77	30.6	51.5	14.5	1.75	3.95	6.58
78	45.7	11.2	56.6	0.41	1.01	9.33
79	42.0	10.1	45.3	0.29	1.88	8.68
80	55.1	11.8	25.5	0.0	1.53	8.18
81	47.6	14.8	45.0	0.98	0.98	8.78
82	41.7	19.5	40.8	0.59	1.17	4.89
83	39.5	18.7	40.9	0.93	2.40	8.93
84	35.4	16.1	32.5	0.65	1.94	9.68
85	45.8	13.7	49.4	1.00	1.00	8.18
86	49.4	13.5	29.3	1.08	1.44	6.86
87	68.1	2.1	47.0	0.35	1.76	7.04
88	68.0	23.2	25.3	0.67	0.67	13.33
89	71.9	23.6	22.9	1.34	0.60	11.18
90	66.9	28.4	26.6	0.68	0.23	15.32
91	67.2	26.5	25.0	0.63	1.27	15.19
92	71.3	23.9	29.1	1.24	0.35	19.08

SOURCE DATA FOR TABLE 1 (CONTD.)

	MARR	EDUC	AGE	FOREST	MINE	MFG
93	71.3	25.1	30.8	0.65	0.65	21.74
94	71.4	21.3	30.5	0.51	0.81	24.57
95	68.2	26.0	27.4	0.72	0.24	22.01
96	69.5	25.1	29.5	1.23	1.23	19.75
97	71.7	20.1	34.0	0.91	0.36	18.40
98	71.4	26.0	31.4	0.55	0.33	23.05
99	70.8	24.7	32.1	0.58	0.23	24.16
100	69.3	35.4	34.7	0.69	1.36	28.03
101	68.1	45.2	31.6	1.13	1.13	39.55
102	61.5	34.5	25.8	1.49	0.75	35.07
103	63.2	27.6	46.3	1.81	0.0	27.71
104	65.2	23.3	24.5	1.71	0.57	24.00
105	61.1	21.6	40.4	0.25	0.63	22.33
106	58.4	21.0	33.2	0.43	0.43	15.86
107	45.4	23.7	33.5	1.64	0.0	17.21
108	53.0	19.8	46.3	1.66	0.55	13.26
109	58.6	19.4	24.8	1.27	0.21	19.87
110	49.4	37.2	30.8	0.31	0.31	16.51
111	60.1	28.5	30.8	1.32	0.22	23.03
112	66.5	31.1	32.9	0.0	0.0	24.04
113	65.5	15.1	22.5	0.63	0.50	18.30
114	68.0	16.9	25.5	0.48	0.24	20.24
115	67.5	24.3	35.0	0.40	0.20	23.26
116	65.1	20.3	33.2	0.58	0.39	17.79
117	67.2	17.2	30.2	0.64	0.32	19.20
118	67.4	18.7	33.0	0.30	0.30	14.96
119	68.6	13.0	53.0	0.41	0.14	15.36
120	65.7	18.5	32.0	0.53	0.13	15.49
121	65.8	17.5	26.5	0.22	0.67	19.33
122	64.0	21.7	30.8	0.0	0.27	15.68
123	66.9	12.1	23.5	0.81	0.40	14.17
124	69.8	19.8	30.2	0.0	0.0	17.69
125	64.3	25.5	26.1	0.43	0.43	23.66
126	61.6	20.2	22.5	0.61	0.0	20.12
127	75.6	13.9	43.9	0.41	0.0	17.70
128	72.0	11.3	25.2	0.98	0.0	20.59
129	68.9	16.2	31.1	0.40	0.81	17.34
130	69.3	17.1	27.8	0.79	0.66	17.59
131	67.5	19.4	28.5	0.37	0.93	19.44
132	68.1	26.6	29.7	0.64	0.48	17.73
133	65.3	23.0	29.6	0.34	0.0	15.98
134	67.4	19.8	29.7	1.04	0.69	17.27
135	68.7	14.6	39.1	0.0	0.71	16.19
136	72.4	5.2	34.5	0.0	3.03	12.12
137	76.2	14.7	40.0	1.08	0.24	21.30
138	29.0	53.5	10.5	0.0	0.0	0.0

	MARR	EDUC	AGE	FOREST	MINE	MFG
139	75.1	16.6	35.9	0.35	0.17	22.73
140	66.4	32.7	30.8	0.0	0.43	26.03
141	66.5	20.0	30.8	0.51	0.0	22.82
142	74.2	14.9	39.1	0.48	0.36	19.23
143	70.4	16.7	30.8	1.07	0.36	20.57
144	74.6	11.7	31.4	0.22	0.45	20.47
145	75.1	23.9	29.6	0.88	0.44	15.49
146	74.8	16.8	37.9	0.19	1.49	18.03
147	76.4	19.1	40.9	1.23	0.92	17.48
148	80.1	14.1	49.0	1.05	1.05	17.77
149	65.8	26.5	26.8	2.07	0.53	20.00
150	68.6	25.5	31.3	1.13	0.28	15.82
151	71.3	27.2	29.2	0.58	1.11	15.39
152	65.1	17.7	22.7	0.74	0.37	8.12
153	57.6	21.7	19.4	0.33	0.0	6.86
154	70.5	21.3	25.9	10.09	10.33	20.89
155	71.8	26.4	25.8	12.88	8.33	9.09
156	67.1	37.2	25.4	7.44	0.50	17.62
157	63.0	29.7	26.5	7.23	0.62	14.67
158	68.4	21.8	31.0	5.02	0.68	12.33
159	70.2	21.3	26.7	5.13	0.43	15.38
160	70.4	31.4	24.6	17.09	0.26	24.74
161	68.8	25.2	25.6	7.95	0.24	29.40
162	67.0	29.0	31.0	9.36	0.37	21.16
163	57.3	22.9	25.8	0.15	0.0	8.93
164	44.9	24.2	17.0	1.14	0.0	5.47
165	54.3	15.0	21.7	0.89	0.30	6.53
166	62.7	14.2	22.7	0.87	0.0	7.83
167	53.3	19.3	32.9	1.46	0.0	4.63
168	47.4	27.5	26.1	0.85	0.0	6.81
169	60.4	27.0	32.2	0.33	0.0	10.89
170	42.9	41.9	17.7	0.0	0.0	8.37
171	66.6	26.7	33.9	1.22	0.41	11.38
172	64.5	31.9	29.0	0.81	0.0	14.98
173	60.4	26.0	29.0	0.98	0.20	12.70
174	64.9	25.0	25.3	1.27	0.0	11.39
175	65.8	8.3	15.3	0.65	0.0	6.51
176	61.1	9.1	17.0	1.51	0.38	4.15
177	60.8	12.6	18.4	0.74	0.50	7.43
178	63.9	7.5	10.3	0.99	0.99	4.43
179	67.5	7.7	12.6	1.06	0.0	7.80
180	62.2	19.0	31.3	1.10	0.37	4.04
181	68.2	18.3	31.3	0.94	0.16	8.59
182	67.0	16.5	19.0	1.62	0.20	8.72
183	68.6	17.0	23.0	1.44	0.0	9.51
184	68.7	22.4	28.4	1.68	0.19	13.25

SOURCE DATA FOR TABLE 1 (CONTD.)

	MARR	EDUC	AGE	FOREST	MINE	MFG
185	69.1	26.4	28.2	0.85	0.42	11.89
186	70.4	21.5	25.[illegible]	1.64	0.23	12.21
187	71.2	26.6	32.8	20.46	0.26	31.97
188	70.2	33.7	36.7	26.52	0.28	11.60
189	70.6	20.7	49.5	24.06	9.04	16.04
190	68.3	33.4	37.7	42.50	0.31	6.56
191	72.1	17.8	51.4	23.46	0.28	48.32
192	70.7	27.2	31.8	15.36	2.70	16.44
193	74.7	20.9	36.1	17.09	1.75	20.58
194	69.7	24.4	32.3	11.46	2.59	20.15
195	69.8	28.8	32.5	11.81	0.21	40.30
196	61.2	31.6	31.7	12.15	0.43	35.36
197	71.6	26.0	35.6	11.02	0.61	31.63
198	73.2	28.2	36.3	11.43	0.22	38.02
199	70.7	23.1	18.1	9.33	0.79	7.14
200	68.2	30.1	23.3	13.86	1.24	8.42
201	69.5	20.4	31.5	7.39	0.80	5.79
202	70.3	22.1	28.9	12.28	1.08	7.76
203	70.8	11.3	29.8	2.37	0.22	2.15
204	73.1	20.3	31.6	5.98	6.39	38.56
205	67.3	29.7	31.8	3.05	0.28	47.92
206	68.6	21.7	38.4	14.34	1.40	25.00
207	59.3	37.9	30.8	10.53	8.48	4.09
208	63.2	33.8	32.6	5.37	0.73	17.56
209	68.5	32.9	34.4	4.93	2.56	18.54
210	72.5	25.3	39.0	3.08	12.50	9.23
211	69.8	32.4	36.3	5.95	21.60	11.56
212	73.6	22.2	29.7	3.03	5.27	11.07
213	67.4	30.0	19.6	1.50	2.36	11.16
214	67.4	36.8	19.5	1.88	1.61	6.99
215	72.3	18.2	25.1	0.61	1.38	10.26
216	64.8	30.3	19.8	0.82	1.23	16.02
217	62.9	27.6	20.7	0.37	1.48	10.17
218	69.5	34.1	30.0	20.59	0.65	10.78
219	68.5	33.5	28.2	1.50	3.69	31.74
220	71.8	36.9	28.0	2.95	2.95	34.51
221	61.6	23.3	24.2	3.80	1.77	11.65
222	64.1	24.0	28.7	1.84	0.92	12.87
223	69.3	30.0	29.3	11.11	15.38	12.82
224	70.8	20.8	27.7	0.56	28.01	16.25
225	71.1	26.2	39.9	5.87	21.07	14.16
226	70.2	30.0	34.4	8.05	2.42	22.87
227	68.7	28.8	30.2	6.21	1.45	6.63
228	68.6	25.1	25.0	1.73	0.0	12.67
229	63.0	29.3	23.9	1.99	0.54	10.85
230	69.0	34.4	27.7	2.20	0.85	14.07

	MARR	EDUC	AGE	FOREST	MINE	MFG
231	68.5	38.2	21.0	5.34	0.46	13.23
232	68.4	29.[illegible]	23.6	4.03	0.50	16.47
233	68.0	33.1	26.7	9.63	1.16	15.28
234	70.5	17.5	30.4	2.30	1.34	7.29
235	61.9	23.1	32.2	2.17	1.58	8.89
236	54.1	27.7	28.7	1.97	0.98	9.25
237	68.7	27.6	36.7	2.27	0.62	10.31
238	68.9	22.7	36.8	2.36	1.07	10.92
239	61.8	31.2	40.6	1.12	1.68	12.15
240	70.1	24.4	39.7	4.84	0.90	20.79
241	66.7	37.4	35.4	9.61	0.0	37.99
242	64.9	30.6	39.4	4.16	0.22	33.70
243	64.0	30.0	37.6	2.58	0.26	31.27
244	63.8	28.8	40.0	11.65	6.22	16.47
245	63.8	29.5	40.7	5.65	0.18	17.49
246	73.3	28.7	46.1	4.25	0.0	50.42
247	73.4	19.9	44.4	1.85	0.0	53.50
248	72.5	28.6	40.5	7.92	1.25	40.00
249	68.9	33.8	34.9	9.79	21.00	16.47
250	69.0	20.4	43.3	4.94	0.0	16.10
251	74.1	31.4	44.9	8.46	0.20	20.67
252	76.9	23.6	41.7	5.13	0.0	17.48
253	72.1	12.9	45.5	3.28	0.22	14.85
254	77.0	26.5	43.7	7.30	0.20	22.52
255	67.7	18.3	51.4	4.52	0.45	16.06
256	66.4	25.2	32.8	3.87	0.20	15.89
257	63.2	31.9	41.0	6.40	0.88	22.74
258	64.1	27.4	35.6	4.53	0.38	13.40
259	66.1	38.4	28.8	15.04	1.39	27.02
260	72.1	33.3	37.1	9.21	0.64	34.48
261	65.5	32.1	30.9	2.41	1.32	6.58
262	68.4	23.2	32.9	1.67	0.95	4.76
263	63.0	26.7	32.2	1.44	1.20	6.73
264	70.6	25.0	40.8	1.10	7.68	7.68
265	67.5	25.4	40.3	0.69	9.49	2.78
266	68.7	32.7	38.8	8.03	0.67	13.38
267	72.9	32.1	47.2	11.97	0.23	30.99
268	66.1	35.9	36.8	8.40	4.20	19.54
269	65.0	43.1	37.0	12.30	7.33	13.09
270	69.2	29.4	35.2	8.24	3.33	8.63
271	63.8	37.2	43.3	11.17	33.69	7.09
272	67.9	27.1	34.2	5.34	1.15	20.23

SOURCE DATA FOR TABLE 1

	FYRM	TEMP	PRECIP	SNOW	AVINCM
1	65.2	17.0	41.7	145.0	6.630
2	73.2	16.0	15.2	64.2	7.720
3	61.0	16.0	15.2	64.2	5.970
4	56.2	24.0	18.9	56.7	5.465
5	63.8	24.0	18.9	56.7	6.245
6	79.8	24.0	18.9	56.7	7.515
7	73.7	23.0	24.8	28.6	6.670
8	77.8	23.0	24.8	28.6	6.785
9	59.5	20.0	17.1	48.6	5.715
10	49.7	20.0	17.1	60.2	5.280
11	39.8	26.0	10.2	26.0	4.635
12	56.3	17.0	14.1	59.5	6.090
13	58.0	31.0	62.1	54.0	6.260
14	63.4	34.0	66.9	33.4	5.440
15	45.5	35.0	64.4	33.0	7.170
16	56.4	36.0	92.6	21.3	6.280
17	55.1	34.0	58.6	28.8	6.460
18	48.9	39.0	55.4	19.2	6.385
19	50.0	39.0	55.4	19.2	4.415
20	69.5	39.0	55.4	19.2	7.260
21	68.2	39.0	55.4	19.2	6.500
22	66.9	39.0	55.4	19.2	6.225
23	72.7	39.0	55.4	19.2	6.140
24	72.8	39.0	55.4	19.2	7.020
25	70.1	39.0	55.4	19.2	13.590
26	69.9	39.0	55.4	19.2	13.955
27	68.5	39.0	55.4	19.2	10.505
28	68.4	39.0	55.4	19.2	13.470
29	66.2	39.0	55.4	19.2	6.050
30	67.6	39.0	55.4	19.2	6.320
31	66.9	39.0	55.4	19.2	6.145
32	63.3	39.0	55.4	19.2	5.975
33	73.0	39.0	55.4	19.2	7.005
34	67.1	39.0	55.4	19.2	5.945
35	64.9	39.0	55.4	19.2	6.155
36	71.6	39.0	55.4	19.2	6.480
37	69.8	39.0	55.4	19.2	6.905
38	71.1	39.0	55.4	19.2	12.345
39	59.7	39.0	55.4	19.2	17.550
40	72.6	39.0	55.4	19.2	9.405
41	70.9	39.0	55.4	19.2	8.780
42	73.4	39.0	55.4	19.2	8.940
43	68.3	39.0	55.4	19.2	7.365
44	72.5	39.0	55.4	19.2	8.515
45	67.3	39.0	55.4	19.2	11.525
46	68.5	39.0	55.4	19.2	13.560

SOURCE DATA FOR TABLE I (CONTD.)

	FYRM	TEMP	PRECIP	SNOW	AVINCM
47	67.3	39.0	55.4	19.2	5.605
48	63.5	39.0	55.4	19.2	6.000
49	63.4	39.0	55.4	19.2	5.680
50	59.0	39.0	55.4	19.2	5.355
51	63.8	39.0	55.4	19.2	5.945
52	65.4	39.0	55.4	19.2	5.705
53	64.1	39.0	55.4	19.2	6.190
54	68.6	39.0	55.4	19.2	6.345
55	58.1	39.0	55.4	19.2	5.150
56	55.7	39.0	55.4	19.2	5.015
57	60.7	39.0	55.4	19.2	5.055
58	69.9	39.0	55.4	19.2	6.495
59	59.1	39.0	55.4	19.2	5.945
60	68.9	39.0	55.4	19.2	6.340
61	65.4	39.0	55.4	19.2	7.680
62	62.2	39.0	55.4	19.2	10.000
63	57.4	39.0	55.4	19.2	6.015
64	56.9	39.0	55.4	19.2	4.740
65	59.8	39.0	55.4	19.2	6.390
66	57.5	39.0	55.4	19.2	5.330
67	45.4	39.0	55.4	19.2	3.735
68	60.4	39.0	55.4	19.2	5.075
69	65.4	39.0	55.4	19.2	5.920
70	69.4	39.0	55.4	19.2	6.010
71	64.9	39.0	55.4	19.2	5.945
72	61.5	39.0	55.4	19.2	5.590
73	64.1	39.0	55.4	19.2	5.620
74	56.0	39.0	55.4	19.2	4.390
75	48.8	39.0	55.4	19.2	2.870
76	41.3	39.0	55.4	19.2	3.000
77	40.2	39.0	55.4	19.2	2.960
78	68.2	39.0	55.4	19.2	6.775
79	66.1	39.0	55.4	19.2	6.975
80	73.0	39.0	55.4	19.2	9.275
81	67.7	39.0	55.4	19.2	5.815
82	61.8	39.0	55.4	19.2	4.845
83	65.3	39.0	55.4	19.2	5.560
84	59.8	39.0	55.4	19.2	6.180
85	58.9	39.0	55.4	19.2	5.065
86	67.4	39.0	55.4	19.2	7.080
87	55.7	39.0	55.4	19.2	10.335
88	61.9	32.0	47.5	10.0	6.770
89	66.6	32.0	47.5	10.0	6.860
90	61.3	32.0	47.5	10.0	6.715
91	65.1	32.0	47.5	10.0	6.410
92	66.8	32.0	47.5	10.0	6.960

SOURCE DATA FOR TABLE 1 (CONTD.)

	FYRM	TEMP	PRECIP	SNOW	AVINCM
93	65.9	32.0	47.5	10.0	7.190
94	70.9	32.0	47.5	10.0	7.265
95	63.4	32.0	47.5	10.0	6.590
96	66.7	32.0	47.5	10.0	6.215
97	72.4	32.0	47.5	10.0	7.440
98	71.2	32.0	47.5	10.0	6.630
99	66.8	32.0	47.5	10.0	6.690
100	58.8	32.0	47.5	10.0	5.720
101	68.0	36.0	59.6	9.3	5.855
102	64.1	36.0	59.6	9.3	6.040
103	58.0	36.0	59.6	9.3	5.045
104	70.4	36.0	59.6	9.3	6.830
105	69.0	36.0	59.6	9.3	5.830
106	65.0	36.0	59.6	9.3	6.160
107	50.7	36.0	59.6	9.3	4.855
108	63.9	36.0	59.6	9.3	5.320
109	69.9	36.0	59.6	9.3	7.070
110	72.0	36.0	59.6	9.3	10.525
111	73.4	36.0	59.6	9.3	5.905
112	65.6	37.0	77.2	8.0	6.465
113	71.3	37.0	77.2	8.0	8.025
114	72.4	37.0	77.2	8.0	7.485
115	70.2	37.0	77.2	8.0	6.290
116	70.5	37.0	77.2	8.0	6.515
117	67.2	37.0	77.2	8.0	7.110
118	72.0	37.0	77.2	8.0	6.600
119	68.1	37.0	77.2	8.0	6.335
120	73.6	37.0	77.2	8.0	7.110
121	74.5	37.0	77.2	8.0	7.395
122	72.4	37.0	77.2	8.0	7.610
123	68.9	37.0	77.2	8.0	10.775
124	73.7	37.0	77.2	8.0	7.430
125	68.0	37.0	77.2	8.0	6.420
126	70.1	37.0	77.2	8.0	6.905
127	73.6	37.0	77.2	8.0	7.980
128	76.6	37.0	77.2	8.0	9.880
129	72.5	37.0	77.2	8.0	7.810
130	72.6	37.0	77.2	8.0	8.350
131	71.8	37.0	77.2	8.0	7.695
132	66.5	37.0	77.2	8.0	6.590
133	67.4	37.0	77.2	8.0	6.680
134	69.4	37.0	77.2	8.0	6.945
135	74.8	37.0	77.2	8.0	7.155
136	73.9	39.0	76.2	16.5	11.155
137	73.7	33.0	140.2	58.0	7.775
138	80.0	33.0	140.2	58.0	1.570

SOURCE DATA FOR TABLE 1 (CONTD.)

	FYRM	TEMP	PRECIP	SNOW	AVINCM
139	74.1	33.0	140.2	58.0	8.265
140	64.0	33.0	140.2	58.0	6.090
141	73.5	33.0	140.2	58.0	7.695
142	73.8	33.0	140.2	58.0	7.935
143	76.1	33.0	140.2	58.0	8.125
144	77.5	33.0	140.2	58.0	9.445
145	71.7	33.0	140.2	58.0	7.885
146	73.2	33.0	90.1	50.3	7.750
147	74.6	33.0	90.1	50.3	8.695
148	74.9	33.0	90.1	50.3	7.855
149	63.4	33.0	90.1	50.3	6.255
150	67.0	37.0	57.5	12.9	8.135
151	57.2	37.0	57.5	12.9	6.550
152	64.1	41.0	31.2	5.3	6.435
153	71.1	41.0	31.2	5.3	5.905
154	65.3	31.0	57.2	9.9	6.310
155	53.2	31.0	38.2	11.9	6.020
156	66.2	37.0	41.4	23.2	5.740
157	57.2	37.0	41.4	23.2	5.705
158	64.1	37.0	41.4	23.2	6.680
159	62.9	37.0	41.4	23.0	6.745
160	63.1	37.0	41.4	23.2	6.695
161	63.8	37.0	43.3	18.4	6.675
162	61.0	37.0	41.1	12.6	6.300
163	68.9	41.0	31.2	5.3	5.685
164	69.6	41.0	31.2	5.3	5.310
165	65.4	41.0	31.2	5.3	7.565
166	76.7	41.0	31.2	5.3	7.025
167	68.0	41.0	31.2	5.3	5.475
168	64.4	41.0	31.2	5.3	4.660
169	64.8	41.0	31.2	5.3	5.610
170	57.8	41.0	31.2	5.3	3.715
171	68.2	41.0	31.2	5.3	5.625
172	56.9	41.0	31.2	5.3	5.640
173	66.4	41.0	31.2	5.3	5.535
174	74.2	41.0	31.2	5.3	6.050
175	70.0	41.0	31.2	5.3	9.450
176	68.9	41.0	31.2	5.3	8.690
177	67.9	41.0	31.2	5.3	6.660
178	63.6	41.0	31.2	5.3	14.040
179	66.1	41.0	31.2	5.3	10.040
180	82.2	41.0	31.2	5.3	6.400
181	77.8	41.0	31.2	5.3	6.795
182	72.6	41.0	31.2	5.3	6.715
183	71.6	41.0	31.2	5.3	7.520
184	73.0	41.0	31.2	5.3	6.735

SOURCE DATA FOR TABLE 1 (CONTD.)

	FYRM	TEMP	PRECIP	SNOW	AVINCM
185	74.0	41.0	31.2	5.3	5.770
186	75.7	41.0	31.2	5.3	6.620
187	71.9	35.0	78.6	47.2	7.310
188	54.2	41.0	121.0	4.5	6.525
189	72.8	36.0	68.9	26.2	8.250
190	46.4	36.0	68.9	26.2	6.550
191	73.0	39.0	149.9	18.9	8.505
192	61.4	36.0	56.1	37.0	6.455
193	65.6	36.0	56.1	37.0	8.350
194	61.9	36.0	56.1	37.0	7.675
195	71.6	38.0	80.8	31.0	7.395
196	68.0	38.0	80.8	31.0	6.915
197	75.5	38.0	80.8	31.0	7.930
198	73.5	38.0	80.8	31.0	7.215
199	52.1	37.0	162.9	13.5	5.755
200	58.7	34.0	57.5	54.9	5.525
201	71.7	35.0	55.5	37.1	6.710
202	61.8	35.0	55.5	37.1	6.445
203	79.2	35.0	46.6	39.0	7.635
204	75.3	38.0	37.1	16.0	7.725
205	71.3	38.0	37.1	16.0	6.505
206	62.3	30.0	86.5	9.5	7.080
207	50.4	27.0	18.3	50.2	5.100
208	63.0	23.0	14.0	24.8	5.930
209	56.4	23.0	14.0	24.8	5.820
210	67.6	25.0	7.6	20.9	7.005
211	65.8	20.0	9.1	28.0	6.980
212	59.5	26.0	11.5	31.8	6.560
213	50.6	26.0	11.5	31.8	5.175
214	54.0	26.0	12.3	18.0	4.645
215	62.5	27.0	11.7	26.7	6.920
216	62.9	27.0	11.7	26.7	5.540
217	54.9	27.0	11.7	26.7	5.345
218	52.4	25.0	29.0	95.3	5.615
219	61.9	25.0	26.2	63.0	6.000
220	62.5	25.0	26.2	63.0	6.140
221	66.3	26.0	23.7	69.5	5.910
222	70.5	26.0	23.7	69.5	6.350
223	58.8	25.0	29.8	89.3	5.860
224	76.6	15.0	15.1	60.3	7.560
225	61.2	15.0	15.1	60.3	6.960
226	66.3	13.0	18.4	80.2	6.710
227	67.5	22.0	42.5	161.5	7.055
228	67.0	22.0	15.4	40.0	6.600
229	66.0	22.0	15.4	40.0	6.220
230	61.2	22.0	15.4	40.0	5.830

	FYRM	TEMP	PRECIP	SNOW	AVINCM
231	50.4	22.0	15.4	40.0	4.825
232	59.2	24.0	21.0	40.0	5.815
233	52.6	24.0	14.3	33.6	5.745
234	71.3	23.0	10.0	29.1	7.830
235	63.8	23.0	10.0	29.1	7.150
236	56.9	23.0	10.0	29.1	7.050
237	66.8	23.0	10.0	29.1	6.315
238	66.5	23.0	10.0	29.1	6.980
239	69.3	23.0	10.0	29.1	7.695
240	71.4	13.0	13.1	33.7	7.155
241	59.7	33.0	174.3	60.2	6.735
242	63.4	35.0	94.4	32.2	7.515
243	60.6	35.0	94.4	32.2	7.255
244	63.1	35.0	94.4	32.2	7.295
245	63.6	35.0	94.4	32.2	7.120
246	55.9	24.0	96.0	117.7	7.515
247	60.3	24.0	96.0	117.7	8.575
248	59.7	17.0	18.0	55.5	7.085
249	59.9	11.0	24.2	87.5	6.305
250	68.8	11.0	24.2	87.5	7.935
251	65.0	11.0	24.2	87.5	7.955
252	72.3	11.0	24.2	87.5	8.350
253	74.1	11.0	24.2	87.5	8.375
254	71.1	11.0	24.2	87.5	8.610
255	72.1	11.0	24.2	87.5	7.190
256	68.2	11.0	24.2	87.5	7.420
257	61.5	11.0	24.2	87.5	6.325
258	66.3	11.0	24.2	87.5	7.560
259	54.3	11.0	24.2	87.5	5.350
260	62.5	15.0	19.7	57.4	6.335
261	59.0	2.0	18.8	92.5	6.005
262	59.4	2.0	18.8	92.5	6.935
263	53.9	2.0	18.8	92.5	6.055
264	68.7	2.0	17.5	76.4	7.755
265	62.9	2.0	17.5	76.4	7.135
266	57.1	-8.0	17.1	67.0	7.250
267	69.9	-8.0	17.1	67.0	7.605
268	62.4	10.0	17.7	67.7	5.925
269	59.5	10.0	18.3	70.2	5.945
270	60.2	12.0	20.3	72.5	6.970
271	55.2	2.0	29.0	176.0	6.530
272	62.5	15.0	19.7	57.4	7.025

SOURCE DATA FOR TABLE 1

	AVINCF	M/F	NIND	OWNED	GROW
1	2.605	1.16	1.05	73.3	40.3
2	2.340	1.02	0.46	80.6	23.5
3	2.495	1.20	2.29	63.2	38.4
4	2.120	0.96	1.45	79.0	5.8
5	1.740	1.08	0.48	77.8	-7.8
6	2.170	1.10	0.17	82.9	10.7
7	2.855	0.97	0.17	63.9	-22.0
8	2.315	1.03	0.37	69.5	11.2
9	1.900	1.00	0.27	77.7	8.8
10	1.925	1.11	0.38	75.8	15.1
11	2.060	1.17	3.60	77.7	20.0
12	1.970	1.32	5.91	70.4	-18.9
13	2.530	1.12	4.72	66.6	-0.4
14	2.480	0.92	5.00	69.5	2.2
15	2.215	1.17	4.89	74.5	13.7
16	2.290	1.01	2.32	74.0	13.5
17	2.650	1.03	2.12	64.8	15.4
18	1.895	1.19	0.82	79.2	31.0
19	3.970	1.67	0.0	66.7	-70.1
20	2.820	0.99	0.32	80.3	4.9
21	2.925	1.02	0.55	70.1	2.4
22	2.645	1.00	0.54	77.1	3.4
23	4.040	0.82	0.58	5.2	6.7
24	3.080	0.92	0.55	73.8	-4.2
25	3.355	0.69	0.0	89.7	-3.2
26	3.470	0.92	0.37	90.2	7.9
27	4.105	0.72	0.07	41.9	-2.4
28	4.460	0.88	0.17	65.7	16.1
29	2.705	0.91	0.38	74.9	1.9
30	3.020	0.92	0.15	72.7	0.2
31	2.625	0.96	0.53	79.0	13.3
32	2.525	0.96	0.26	73.3	-1.2
33	2.580	0.91	0.16	78.2	6.5
34	2.660	0.98	0.49	76.2	6.2
35	2.615	0.96	0.89	82.1	2.3
36	2.915	0.97	0.92	81.4	3.2
37	2.975	0.89	0.51	66.8	-1.8
38	3.970	0.91	0.0	79.1	18.8
39	4.940	0.86	0.31	84.4	-3.8
40	5.250	0.56	0.18	10.9	-10.4
41	3.405	0.95	0.0	90.5	-4.5
42	3.020	0.92	0.17	90.1	-3.7
43	3.275	0.91	0.07	86.0	0.0
44	2.875	0.86	0.11	80.3	-1.7
45	3.970	0.88	0.0	75.7	1.9
46	3.690	0.60	0.26	58.1	-1.3

SOURCE DATA FOR TABLE 1 (CONTD.)

	AVINCF	M/F	NIND	OWNED	GROW
47	3.690	1.02	0.36	57.3	-2.2
48	2.720	0.98	0.94	71.3	2.5
49	2.950	0.95	0.69	56.0	2.9
50	2.810	0.96	0.51	65.5	3.9
51	3.060	0.94	0.61	76.8	-2.2
52	2.715	0.98	0.53	74.5	6.9
53	2.625	0.98	0.60	79.2	3.6
54	2.660	0.99	0.31	88.0	1.8
55	2.590	0.98	0.66	46.1	1.9
56	3.055	0.96	2.04	21.1	21.6
57	3.070	0.71	1.28	12.9	1.1
58	4.275	0.56	0.30	3.5	11.2
59	3.615	0.68	0.50	21.7	3.3
60	3.195	0.92	0.29	71.2	-2.7
61	3.370	0.87	0.41	71.7	-0.4
62	4.165	0.89	0.11	58.3	-14.2
63	3.380	0.90	0.66	38.6	0.1
64	3.425	0.89	0.46	14.5	9.4
65	4.210	0.74	0.07	7.8	15.5
66	3.525	0.83	1.48	16.0	-2.2
67	2.170	1.36	1.46	17.5	-24.8
68	2.830	0.99	1.86	22.2	21.1
69	2.585	1.02	0.58	81.8	5.3
70	2.445	0.93	1.23	73.4	1.5
71	2.870	0.97	0.95	78.1	2.9
72	2.390	1.01	0.51	75.0	5.3
73	2.775	0.98	1.48	32.0	24.8
74	2.670	1.06	2.30	28.0	11.2
75	1.980	1.59	3.37	19.6	17.9
76	1.860	3.12	5.26	27.6	-22.0
77	2.495	4.54	2.43	7.0	-23.4
78	4.020	0.91	0.22	2.0	36.0
79	4.125	0.62	0.50	3.5	3.3
80	4.740	0.72	0.27	8.1	22.2
81	3.480	0.96	0.29	3.8	15.7
82	3.260	0.86	0.75	1.9	7.8
83	3.580	0.83	0.62	2.4	12.3
84	3.655	0.91	0.0	2.0	-17.4
85	3.665	1.02	0.95	4.0	28.8
86	4.040	0.67	0.32	5.5	16.8
87	4.180	1.05	0.41	39.2	21.4
88	2.590	1.10	0.41	80.6	24.6
89	2.560	1.02	0.53	80.2	39.9
90	2.150	1.11	0.09	79.1	16.6
91	2.215	1.04	0.24	76.3	25.8
92	2.615	1.05	0.40	86.5	25.5

SOURCE DATA FOR TABLE 1 (CONTD.)

	AVINCF	M/F	NIND	OWNED	GROW
93	2.655	1.08	0.86	83.2	15.6
94	2.490	1.04	0.53	84.6	12.4
95	2.565	1.06	0.95	80.3	14.7
96	1.935	1.13	0.50	82.6	8.4
97	2.780	0.99	0.48	61.6	33.4
98	2.615	1.00	0.50	75.2	21.1
99	2.550	1.03	0.50	72.8	16.5
100	2.455	1.04	0.92	72.8	7.4
101	1.850	1.14	0.99	71.6	6.9
102	2.510	1.00	0.33	68.9	9.1
103	2.660	1.27	2.90	22.0	-1.5
104	2.730	0.98	0.73	77.7	0.4
105	3.120	0.92	0.44	18.4	50.3
106	3.295	0.83	0.66	13.5	46.8
107	3.465	1.11	0.0	5.0	-0.8
108	3.625	0.90	0.36	7.7	-0.1
109	3.230	0.89	0.09	51.2	-0.8
110	3.265	1.29	1.20	81.7	-3.6
111	2.915	0.81	0.31	53.0	2.6
112	2.890	0.99	0.82	62.9	-6.5
113	2.770	1.03	0.38	85.3	2.0
114	2.660	1.01	0.30	85.2	1.3
115	2.985	0.95	0.59	52.4	26.8
116	3.195	0.90	0.53	32.3	37.2
117	2.480	1.02	0.56	64.6	8.7
118	3.080	0.91	0.85	36.9	22.1
119	3.735	0.89	0.33	5.1	81.1
120	3.015	0.87	0.63	46.1	12.4
121	2.850	0.96	2.30	70.0	-2.2
122	2.605	1.13	1.43	77.2	2.1
123	3.575	0.96	0.18	86.5	12.7
124	2.745	1.14	0.0	78.7	24.4
125	2.755	0.98	0.18	77.0	1.1
126	3.250	1.03	0.37	83.2	2.2
127	3.205	0.99	0.0	46.2	42.3
128	3.075	1.07	0.79	90.8	37.4
129	2.940	1.02	0.93	71.0	25.8
130	2.700	0.98	0.39	77.9	18.5
131	2.900	0.99	0.18	73.7	4.9
132	2.835	0.97	0.22	70.8	-5.6
133	2.755	0.93	0.08	66.7	-2.5
134	2.820	0.99	0.24	75.7	1.2
135	2.760	1.03	0.19	57.5	41.0
136	3.605	1.00	0.0	92.0	229.0
137	2.815	0.99	0.37	64.5	52.9
138	1.300	0.86	0.0	0.0	-29.5

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SOURCE DATA FOR TABLE 1 (CONTD.)

	AVINCF	M/F	NIND	OWNED	GROW
139	2.950	1.04	0.20	85.6	20.0
140	2.540	1.03	0.41	65.9	5.6
141	2.705	0.97	0.21	61.3	20.2
142	3.020	0.96	0.29	56.4	70.8
143	2.645	0.97	0.28	72.5	46.7
144	2.880	1.03	0.08	95.4	43.0
145	2.625	1.07	0.19	87.0	44.0
146	2.810	0.99	0.47	81.3	80.6
147	2.855	0.98	0.12	75.7	65.8
148	2.830	1.05	0.0	88.3	88.4
149	2.555	1.03	0.66	74.7	26.8
150	2.795	0.95	0.54	62.1	64.5
151	2.285	1.06	0.55	80.8	39.7
152	2.725	0.85	0.46	69.8	-1.7
153	2.995	0.70	0.26	37.5	7.5
154	2.490	1.10	1.90	66.2	15.4
155	2.380	1.12	4.95	70.0	16.4
156	2.080	1.01	6.54	74.4	-22.0
157	2.690	1.07	0.92	64.8	-27.4
158	2.425	0.91	1.92	60.3	-2.0
159	2.715	1.00	0.90	72.9	-17.9
160	2.070	1.01	7.53	81.7	-1.4
161	2.330	1.05	1.89	79.4	27.9
162	2.600	0.95	17.61	67.8	-3.2
163	3.240	0.81	1.20	18.7	12.9
164	2.975	0.50	0.27	11.8	6.7
165	3.370	0.73	0.0	42.8	9.9
166	3.630	0.88	0.19	70.1	3.9
167	3.165	0.69	0.66	18.8	46.8
168	2.885	0.78	2.14	23.8	5.2
169	2.535	0.94	0.71	57.6	10.1
170	2.780	1.28	1.00	16.8	-17.0
171	2.635	0.97	0.16	51.7	7.9
172	2.660	0.96	5.20	56.5	-2.8
173	2.425	0.89	1.62	52.6	10.3
174	2.510	0.89	0.34	72.3	2.5
175	3.365	0.82	0.0	83.0	-2.0
176	3.565	0.71	0.14	56.4	9.6
177	3.505	0.79	0.0	58.7	6.2
178	4.495	0.88	0.0	89.9	-4.3
179	3.060	0.97	0.0	95.7	-3.5
180	2.480	1.09	0.44	53.4	-4.9
181	2.700	0.97	1.25	55.5	1.1
182	3.160	0.91	0.09	66.5	6.1
183	2.555	0.88	0.0	76.2	4.8
184	2.540	0.92	0.99	70.3	5.5

SOURCE DATA FOR TABLE I (CONTD.)

	AVINCF	M/F	NIND	OWNED	GROW
185	2.350	0.92	0.25	73.7	2.1
186	2.370	0.93	0.66	79.2	-0.9
187	2.375	1.14	0.28	73.1	0.4
188	2.240	1.22	27.46	55.6	-15.6
189	2.390	1.47	7.67	49.6	16.4
190	2.190	1.33	25.03	65.0	-16.9
191	2.810	1.49	3.03	43.6	22.7
192	2.395	1.11	1.23	79.9	-23.6
193	2.245	1.10	3.34	72.1	76.6
194	2.645	1.05	6.07	65.1	-3.5
195	2.375	1.15	2.38	74.5	-1.9
196	2.400	1.13	5.47	56.6	27.1
197	2.930	1.11	2.14	67.5	15.1
198	2.620	1.03	3.62	78.9	12.3
199	2.335	0.97	0.88	80.6	45.2
200	2.380	1.04	1.01	79.0	2.6
201	2.570	1.02	1.78	64.7	4.5
202	2.165	1.09	0.77	74.4	-12.6
203	2.405	1.07	0.94	55.0	38.4
204	2.555	1.03	0.23	76.0	47.7
205	2.060	1.07	8.57	76.2	-12.6
206	2.175	1.21	3.15	57.9	20.4
207	1.900	1.26	33.81	65.5	-31.0
208	2.810	1.23	18.96	60.0	-9.3
209	2.425	1.16	6.70	65.8	14.5
210	2.745	1.17	1.98	69.9	36.0
211	2.275	1.16	7.74	64.5	19.5
212	2.480	1.12	3.86	80.6	84.9
213	2.125	0.99	4.31	82.1	14.3
214	2.160	0.98	2.73	70.1	-18.0
215	2.405	0.99	0.50	84.8	68.7
216	2.610	0.9[illegible]	0.24	69.9	-4.2
217	2.470	0.91	0.23	64.4	4.6
218	1.930	1.15	0.71	79.2	-19.6
219	2.265	1.01	0.0	72.2	-23.1
220	2.320	1.09	0.0	81.2	-18.5
221	2.750	0.97	0.22	64.1	-18.2
222	2.660	0.94	0.0	64.7	22.1
223	2.240	1.12	0.42	78.5	-14.0
224	2.280	1.05	0.23	82.3	3.5
225	2.365	1.22	2.11	68.7	24.9
226	2.305	1.20	1.03	70.2	17.8
227	2.575	1.13	0.18	61.7	2.7
228	2.430	0.95	0.15	78.1	28.5
229	2.655	0.88	0.44	58.9	9.1
230	2.320	1.06	5.06	74.3	37.5

SOURCE DATA FOR TABLE 1 (CONTD.)

	AVINCF	M/F	NIND	OWNED	GROW
231	1.920	1.00	3.60	82.0	10.9
232	2.510	0.99	1.75	77.7	14.5
233	2.015	1.10	7.59	78.5	38.5
234	2.725	1.09	1.22	64.1	22.7
235	2.740	1.14	0.28	65.9	2.4
236	2.995	0.98	1.93	36.2	12.9
237	2.520	1.04	0.55	59.5	7.7
238	2.905	1.03	0.85	55.6	1.0
239	2.995	1.11	1.99	79.1	71.8
240	2.580	1.06	3.09	54.7	4.6
241	2.495	1.19	37.50	45.9	-31.4
242	2.700	1.25	25.55	64.2	1.6
243	2.520	1.15	24.86	62.1	3.4
244	2.770	1.22	16.74	44.6	-11.8
245	2.925	1.32	18.93	47.2	36.3
246	2.735	1.21	16.56	72.6	33.5
247	3.065	1.24	1.19	57.2	29.0
248	2.745	1.23	1.99	66.3	16.4
249	2.240	1.26	8.75	69.2	-4.9
250	2.555	1.08	2.48	51.0	35.3
251	2.560	1.21	3.83	82.3	32.1
252	2.445	1.07	0.99	80.2	20.7
253	3.260	0.99	0.69	55.6	86.2
254	2.635	1.14	2.52	75.7	10.3
255	3.630	1.09	1.56	35.5	-25.0
256	2.830	1.01	0.63	64.1	-7.3
257	2.940	1.21	8.28	49.7	-25.7
258	3.045	1.18	3.72	53.2	-12.4
259	2.020	1.36	3.00	68.5	0.9
260	2.330	1.19	4.18	67.7	12.3
261	2.455	1.06	3.43	72.5	-4.5
262	2.440	1.09	1.18	74.0	0.3
263	2.800	1.10	4.38	63.1	6.8
264	2.515	1.20	1.65	69.3	24.0
265	2.790	1.05	2.99	61.5	-2.6
266	2.520	1.22	13.21	63.5	-13.8
267	2.325	1.33	4.81	72.8	70.6
268	2.400	1.20	17.32	72.5	23.3
269	2.615	1.22	32.70	65.3	11.1
270	2.605	1.08	6.85	73.7	34.0
271	2.350	1.36	37.79	58.8	5.0
272	2.945	1.13	0.32	67.4	5.5

Date Due

FEB 10 1982			