

Leading and Lagging Census Subdivisions in Rural Canada

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Leading and Lagging Census Subdivisions in Rural Canada¹

1. Introduction

The analysis of leading and lagging places in rural Canada has become an important focus for the work of the New Rural Economy Project (NRE). Stimulated by discussions in the OECD, the distinction appears to resonate with a wide range of interests among rural Canadians.

It appeals to *administrators and policy-makers* in their search for clear criteria on which to allocate different types of resources. It is assumed that leading places should be supported in the confidence that additional resources will strengthen a solid foundation. Lagging places could be provided with tailor-made programs which might help to reverse their fortunes or mitigate the most negative effects of their status. By focusing on the differences between the two, we might come to identify the ways in which lagging places could move toward a leading status.

Local rural Canadians and community developers have also shown an interest in the distinction between leading and lagging in spite of their dissatisfaction with the labels. Advocates of the 'best practice' approach to community development see it as an opportunity to identify models for local groups to emulate as they search for ways to improve their situation. From this point of view, leading places are useful because they show what types of community practices work. For those living in such places, being labelled a leading region can serve as an inspiration and a selling point in their search for recognition. At the same time, however, rural citizens are wary of the negative effects of the distinction. Being labelled a lagging region carries a stigma which can marginalize the region both from within and without.

Many *researchers* are sensitive to the ways in which the terms "leading" and "lagging" are a reflection of social power and thereby help to shape entitlements. Labelling a region as one or the other is not benign, since it carries considerable social and political baggage which can be used to exclude and include regions or communities from getting access to important resources.

At the same time, however, researchers have found the distinction is consistent with the value of comparison as a technique for increasing understanding.² From this perspective, comparison of leading and lagging places promises considerable opportunity for learning. By examining the differences between these two type of places we should be able to stimulate creative ideas regarding the reasons for those differences, and test those ideas through a systematic examination of them. The comparisons

¹ This research has been made possible through the support of the **New Rural Economy Project** of the *Canadian Rural Restructuring Foundation* and its Partners. These include *Human Resources Development Canada*, *The Rural Secretariat of Agriculture and Agri-Food Canada*, *Statistics Canada*, and *Concordia University*. For additional information regarding the project see: <http://nre.concordia.ca>

² In spite of researchers' general commitment to the principle of comparison, our review of the literature related to leading and lagging places revealed that the primary focus is on those with lagging status. There are few studies of leading places and virtually none which make a comparison between the two types of places. These findings reinforce the expected value of the NRE approach.

can also point to the processes which might contribute to changes in the fate of communities: from leading to lagging, or from lagging to leading.

These multiple interests suggest that we are likely to gain considerable advantage by looking more closely at the distinction between leading and lagging places and the processes which contribute to changes in these statuses. They also point to the dangers in such an examination, warning us to avoid reification of this distinction. It is in this spirit that we have conducted the following analysis.

Our research approach begins with three basic questions:

- C "What is meant by "leading" and "lagging" with respect to rural places?",
- C "To what extent are places actually differentiated with respect to leading and lagging status?",
and
- C "What are the most likely processes underlying the differentiation of leading from lagging regions?".

To answer the first question we will turn to the constituents mentioned above to identify the various ways in which these concepts are defined: by *policy-makers and administrators*, by *rural citizens and community-development personnel*, and by *researchers*. To answer the second question we will conduct an analysis of available data in the form of 1991 census subdivision (CSD) data from Statistics Canada. To answer the third question we will make use of the theoretical insights of rural researchers, along with the empirical analysis of the CSD database prepared as part of the NRE project.

2. First Question: What is meant by "leading" and "lagging"

The concepts "leading" and "lagging" are usually associated with economic performance of particular communities or regions. Akpadock (1993) uses "lagging" in reference to communities suffering from plant closings, stagflation, capital disinvestment, massive unemployment, and uneven economic development. Lonsdale and Clark (1995) describe the Great Plains as an "economically lagging region" when examining employment patterns and changes in the economic structure. Aiken (1995) is one of the few authors who compares leading and lagging areas in his analysis of the emergence of "two souths" based on comparisons of farm population, spatial changes in agriculture, and racial integration.

One of the most substantial comparisons between leading and lagging regions can be found in the writing of the Project on Rural Employment Indicators undertaken for the Organisation for Economic Co-operation and Development (OECD, 1996). The authors make a case for the examination of dynamic indicators of economic development and in the process liberally refer to "leading" (sometimes referred to as "dynamic") and "lagging" regions.

Important results using this perspective have begun to emerge from the RUREMPLO team³. Using rural employment as an indicator of leading and lagging status, they have identified the role of regional

³ The RUREMPLO project includes an analysis of the socio-economic characteristics in all EU regions and 18 case studies of leading and lagging rural regions in 9 EU member States (RUREMPLO, 1998).

characteristics for changes in employment. These characteristics include differences in administrative structures, development forces originating inside and outside the region, social networks, local institutions, integration or exclusion from market forces, and the nature of those markets. They point to the important interactions which occur among these characteristics in affecting the employment status of the regions.

In all studies the approach to leading and lagging status contains three important implications. First, they include a spatial or regional point of reference. Second, they refer to the economic or sometimes welfare status of the region, and third, they imply a dynamic quality, where changes in status are expected over time. Leading regions are in some ways more advanced with respect to lagging ones or they have important advantages with respect to economic or social outcomes, but they have not necessarily always been that way, and will not necessarily continue that way in the future.

These characteristics are usually preserved in the more policy-oriented discourse regarding leading and lagging regions. These discussions often include a broader focus than the economic one found in the more academic literature, however. Regions may be considered leading with respect to education, health, or housing characteristics as well as with respect to incomes or employment. The specific indicators of leading and lagging status will vary depending on the interests of those asking the questions.

As outlined above, there are three types of people most likely to show an interest in the analysis of leading and lagging rural regions in Canada. These types will form the basis for the operational decisions we make when exploring this distinction.

The first type of concern stems from administrators and policy-makers. Their concerns are most often linked to the mandates they face from their organizations or political constituents: to deal with current social, economic, and fiscal problems. In most cases this requires them to consider the adequacy of service provision to various regions. From this perspective, leading places are those which have few social and fiscal problems, are adequately serviced, and are done so at low cost. Lagging places are those which drain the resources of the various agencies and organizations: through high cost, political intimidation, or moral imperative. Most often, the indicators of the leading or lagging status will include employment levels, extent of transfer payments, income levels and sources, divorce and separation rates

The second type of concern is that of Canadians living in rural areas and the community activists which support them. Most often, these concerns are linked to the quality of life and opportunities in their communities. Leading places are those which maintain adequate services, both in terms of quality and quantity, provide opportunities for local people, and do so in a manner which is sustainable and attractive. Lagging places are those which cannot support their population at adequate levels: economically, socially, or environmentally. Currently available indicators for these aspects of rural places are limited, but they might include income levels and housing characteristics. This is clearly an area which requires additional information to be gathered regarding such things as recreation, consumer services, entrepreneurial options and activities, social networks, and the quality of the environment.

The final type of concern regarding the leading and lagging distinction is expressed by researchers. Their concerns are tied to a wide variety of theoretical issues regarding the processes affecting rural

people: globalization, wealth creation, organizational restructuring, political action, and historical trends. From this perspective, leading places are those which create wealth, support a basic economic, social, and organizational infrastructure, and are sufficiently resilient to do so in the face of rapid change. Lagging places are those which are unable to avoid marginalization: economically, socially, and politically. Once again, indicators relating to these issues are limited in the available material to such variables as population change, economic inequality, and sectoral employment.

All three of these perspectives will be reflected in the exploration which follows. This will permit us to investigate the implications for each type of concern and at the same time increase the chance for serendipitous outcomes from the analysis.

3. Second Question: To what extent are places differentiated on these dimensions?

These conditions leave us with imprecise definitions and a limited number of indicators at our disposal with which to explore them. Nevertheless, census information is sufficient to consider whether there is some empirical basis for our speculations and perhaps even for us to learn something about the ways in which the various elements are related.

We will use factor analysis to conduct this exploration.⁴ It is a technique which allows us to determine the extent to which the characteristics of places are related. We can ask, for example, "To what extent are places with high levels of unemployment also likely to lack services?" It will also allow us to test our assumption that lagging and leading are multidimensional concepts, not only conceptually, but empirically as well.

Factor analysis will not only identify the extent to which characteristics are related, but can also be used to reflect the extent to which groups of related characteristics can be distinguished from other groups. It may therefore help us to identify the dimensions on which lagging and leading regions might be differentiated.

Factor analysis was conducted using variables which represent outcomes of major processes affecting rural Canada (cf. Table 1).⁵ They are grouped separated into the 3 concerns outlined above although there is considerable overlap among those concerns.

⁴ The author would like to acknowledge the valuable contribution of Phil Keddie in the development of this analysis.

⁵ We have identified rural CSDs as those which are outside Census Metropolitan Areas, Census Agglomerations, and which have a 1991 population under 20,000.

Table 1: Census Variables Selected for Factor Analysis⁶

Census Variable	Mnemonic
Administrative and Policy Concerns	
Unemployment rate, both sexes 15+	CS91B247
Participation rate, both sexes 15+	CS91B248
Employment income %	IN91CEMP
Government transfer payments %	IN91CGTP
% of households below LICO	CS91B515
% divorced	PDIVO91
% separated	PSEPA91
Local Concerns	
Median income, household income \$	IN91HHME
Median income, females 15+ \$	IN91F15M
% of dwellings needing major repairs	PDW91MJ
Average value of dwelling \$	DW91AVVL
% dwellings owned	PDW91OWN
% of hh where gross rent \geq 30% of hh income	PH91RTGT
Owners major payments \geq 30% of hh income	HH91PYGT
Researcher Concerns	

⁶ Several variables from the census were excluded since they were so highly intercorrelated that they acted as multiple measures for the same concept. The incidence of low income for economic families and individuals were eliminated and CS91B515 was left in since it reflects both families and individuals and it had the highest communality of the three. Median incomes for families and males over 15 years were eliminated. IN91HHME was included for the same reasons as CS91B515, and IN91F15M was included since it had a low partial correlation with IN91HHME. The unemployment rate for both sexes 15 to 24 years of age was eliminated since it reflects a smaller group than CS91B247 and it had a lower communality. The participation rate for ages 15 to 24 was eliminated for the same reasons. The percentage of income from other sources was eliminated since it had a small communality and its partial correlation was related to the most other variables. The average number of persons per room was eliminated since its partial correlation was related to many other variables. Three variables were also eliminated since they had many missing cases and their communality values were relatively low: the ratio of male to female unemployment rates, the percentage change in employment from 1981 to 1991, and the percentage change in population from 1986 to 1991.

Census Variable	Mnemonic
% of workers self-employed	LF91SET
% intellectual, managerial, artistic occs	POCIMA91
income inequality index for families	INEQUF91

The analysis produced four primary factors, accounting for 63% of the variation in the variables.⁷ They are identified in Table 2 on the basis of the variables which are most strongly associated with them. The first factor is associated with income levels, particularly as they relate to employment income. The second is associated with the level of housing tenure in the CSD, reflecting a negative relationship with separation and divorce. The third factor is associated with the level of self-employment and unemployment in the CSD, and the fourth is associated with the cost of dwellings and levels of female incomes.

Table 2: Selected Statistics from Factor Analysis

Factor and Principal Variables - 1991	Coefficient	Primary Interest Group	Mnemonic
Employment Income-related: 30% of variance			
% of people with employment income	.968	Policy	IN91CEMP
CSDs with a high labour force participation rate	.819	Policy	CS91B248
median household income	.706	Citizens	IN91HHME
% of people with government transfers	-.760	Policy	IN91CGTP
% of households below the Low Income Cutoff	-.400	Policy	CS91B515
Housing Tenure and Marriage-related: 17%			
% of dwellings owned	-.811	Citizens	PDW91OWN
% of households where the gross rent is greater than 30% of the household income	.793	Citizens	PH91RTGT
% of people who are separated	.579	Policy	PSEPA91
% of people who are divorced	.575	Policy	PDIVO91

⁷ Principal component extraction was used and oblimin rotation with Kaiser normalization was conducted. Additional statistics are included in Appendix A.

Factor and Principal Variables - 1991	Coefficient	Primary Interest Group	Mnemonic
Self-Employment-related: 8%			
% of self-employed workers	-.839	Researchers	LF91SET
the unemployment rate	.660	Policy	CS91B247
Housing cost-related: 8%			
average value of dwelling	.860	Citizens	DW91AVVL
median income for females 15+ years	.636	Citizens	IN91F15M
% of people in intellectual, managerial, or artistic occupations	.575	Researchers	POCIMA91
% of households below the Low Income Cutoff	-.564	Policy	CS91B515
% of owners whose major payments are greater than 30% of their household income	.526	Citizens	HH91PYGT

3.1. Implications of the Factor Analysis

The factor analysis shows important clustering of the variables. The first four factors account for 63 percent of the total variance and the first two factors account for 47 percent. Since these factors are largely unrelated, the results support our position that the leading and lagging distinction must be treated as multidimensional. It also implies that the processes underlying them are likely to be different, the causes and consequences are different, and thus the policies which address them must be different. This suggests that multiple directions are needed for research.

A closer look at the variable loadings for each of the factors provides important clues regarding the possible processes involved. Incomes from employment are associated with the proportion of people in the labour force, but levels of self-employment are more related to the proportion of unemployed people among those already in the labour force. In other words, having a large proportion of the population over 15 years who have dropped out of the labour force is likely to affect the level of employment income in general, but it is not strongly related to the level of self-employment. Similarly, transfer payments are more related to processes associated with labour force participation than self-employment.

These results have important implications for various policy concerns and options. If increasing income levels or minimizing transfer payments are policy priorities, then increasing participation in the labour force may be a more important goal than increasing self-employment. If job creation through self-employment is a priority, then we are likely to find that this has a relatively small impact on income levels or the level of transfer payments.

The factor analysis also suggests that housing issues are multidimensional: differing with respect to tenure and cost. Rented housing is more likely to be associated with a high proportion of single and divorced people, and high-cost housing is more likely to be found where incomes for females are higher and there are a relatively high proportion of people in intellectual, managerial, or artistic occupations.

A geographical analysis of the leading and lagging CSDs⁸ reveals some important regional variations, usually reflecting five major areas of rural Canada. Table 3 outlines the regions and dimensions with summary descriptions (cf. Appendix C for the relevant maps).

Table 3: Factor Analysis Dimensions by Geographical Regions

Dimension	Atlantic*	Metro Adjacent QC & ON	Northern ON	Prairie Triangle	BC
Employment Income	lagging	leading	leading to mixed	mixed	leading (except some southern)
Home Ownership & Marriage	leading	lagging (except SW ON)	lagging	leading	lagging
Self-Employment	lagging	leading	lagging	leading	lagging to mixed
Housing cost	lagging	leading	mixed	lagging (mixed in AB)	leading to mixed

* **Atlantic:** includes NF, NS, PE, NB, and Eastern QC

Metro Adjacent QC & ON: includes regions surrounding metropolitan centres of Montréal, Ottawa, Toronto, Hamilton, and Windsor.

Northern ON: includes sites near the Trans Canada Highway, north of Lake Superior

Prairie Triangle: includes triangle approximately bounded by Winnipeg, Grand Prairie, and Lethbridge

BC: includes sites in BC

As shown in Table 3 each region has some CSDs which are leading on some dimensions while lagging on others. Even at the level of individual CSDs this pattern continues: not many CSDs are leading or lagging in all dimensions. For example, less than 10 percent of them leading or lagging on more than two of the dimensions. These results confirm the multidimensional nature of the leading and lagging categories, even at relatively small units of analysis.

⁸ Leading and lagging status was assigned to the four dimensions on the following basis. Leading CSDs on the employment-income dimension were considered to be those with high levels of employment income and labour force participation. Those with a high percentage of owned dwellings and few households where the rent was more than 30% of the income were considered to be leading on the housing tenure dimension. CSDs with a high percentage of self-employment and low unemployment rates were considered to be leading on the self-employment dimension (this factor is highly sensitive to agricultural production) and those with high-valued dwellings and high female incomes were considered leading on the housing-cost dimension.

3.2. Evidence from the Field Sites

The field work component of the New Rural Economy Project provides an excellent opportunity to examine the validity of the census-based analysis. Thirty-two rural sites were identified for field work in this project and 25 of them have already been profiled by site teams. The sampling frame for the selection of those sites ensured that both leading and lagging sites were included in the selection and the initial investigation of the sites involved an assessment of the classification based on census data.

This assessment identified only 2 of the 25 sites which were misclassified using the census-derived indicator. Both of them were identified as leading sites by the census data, whereas the local teams identified them as lagging on the basis of the field data. The field teams also identified the importance of the point of comparison for the identification of leading or lagging status. Sites which are lagging using a national focus might be leading as considered from a regional point of view. Similarly, the site boundaries can affect the assessment, since some sites might be considered lagging within their CSD boundaries, but can take another status if larger regional boundaries are considered. These issues will continue to be explored as the field work progresses. They can also be addressed by regional studies using the census data (Alasia, 1998).

4. Third Question: "What are the most likely processes underlying the differentiation of leading from lagging regions?"

4.1. General Processes

Since the leading and lagging dimensions are relatively independent, this question must be asked of each of them in turn. As with the definition of the dimensions we will proceed using a combination of both theoretical and empirical tools. Theoretically, we ask "What are the likely processes differentiating leading from lagging regions based on our current understanding of each dimension?" and empirically, we ask "Which variables (and combination of variables) do the best job of discriminating the leading from the lagging places on each dimension?".

Six general processes have been identified from a review of the literature regarding rural and community development (Reimer, 1995, 1998). Since our objective at this stage is primarily exploratory, the distinctions are created with a view to being inclusive and flexible rather than exclusive. Variables related to each of the processes will be selected and discriminant analysis will be used to explore which of them are most likely to differentiate the leading from lagging CSDs.

4.2. Demographic Processes

Demographic processes are some of the most fundamental elements of social change. People are born, they age, they move, and they die: events which place constraints and possibilities on human action which are pervasive and profound. These processes are reflected in a number of important characteristics of rural locations.

The age distribution of the population is fundamental to the demands on services, the size and nature of the labour force, the patterns of consumption, and the political importance of the site, to name only

a few. The sex distribution within locales is also related to these aspects, with the additional impact on birth and marriage patterns. General analysis of the rural population shows a distribution with a high proportion of young and old by comparison to urban regions. Rapid changes in this distribution also contribute to various forms of social disruption and stress.

Movement in or out of a region is related to its economic opportunities and social cohesion since they directly affect the human and social capital of the locale. They may also be interpreted as a reflection of shifting opportunity costs and information flow.

The types of living arrangements found in a locale are related to the nature of socialization taking place, the services required, consumption patterns, the social cohesion, and the future demographic profile of the region. All of these can contribute to the leading and lagging status of the place: as direct influences and as conditions on other processes.

4.3. Economic Processes

Processes related to the operation of the economy are extensive and complex. We have subdivided them into three major types to reflect the extent of the literature and to link them appropriately to the available variables.

4.3.1. Skills and talents

In order for commercial economic activity to take place it is necessary to have people who are willing and able to do the work. A trained labour force will provide the basis for economic growth. Gender differences are especially important since they are related to a number of other important opportunities at the local level. The existence and nurturing of individuals who are sufficiently skilled to initiate and expand economic ventures is also considered an important element in the economic viability of regions.

4.3.2. The structure of work

The type of industries in the region links the local economic and social resources to the broader economy. Changes in that broader economy will have differential effects of the local region according to the industries affected. In addition, the particular mix of occupational groups at the local level is related to the vulnerabilities and opportunities for economic growth. Changes in the ratios of managers, trades, and unskilled workers in the community affect the availability of trained workers.

The structure of pluriactivity, part-time work, self-employment, and wage work have been undergoing considerable change. These not only reflect broad changes in the economy, but are likely to have significant impacts on the capacity for local regions to generate wealth. In addition, the segmentation of the labour market into two or more relatively independent sectors creates severe limitations on the movement and training of labour. Since this segmentation is strongly related to local and regional characteristics, it produces differential opportunities by these regions. The history of relations between those who control capital and the local labour force will affect the options available to both parties. The role of the unions is an important aspect of this factor.

A considerable amount of unpaid and exchange work takes place which is not represented in official economic statistics. This type of activity is often crucial to the flexibility of a local economy and the

social cohesion of a community. It is also highly gender-related, especially in the case of housework and child-care.

4.3.3. Economic Capital

Local areas will vary with respect to the sources and amount of income and wealth which are available to them. This in turn will significantly affect the opportunities which are available to people along with their ability to act on those opportunities. As a result, income and wealth are consistently treated as important indicators of whether a region is lagging or leading.

This is also the case for the availability, characteristics, and control of capital. People in local areas must be able to find and control the appropriate type of capital for their economic growth. Both private and public sector institutions should be considered within this framework, not only with respect to their availability, but also with respect to their policies and practices for the distribution and investment of public and private capital. These will be reflected in both the formal regulations of the institutions as well as the more informal preferences and practices of their employees.

4.3.4. Economic Resources

Natural resources have always provided the fundamental economic advantage of rural places. They not only provide the raw materials for export outside those areas, but they are most often the drivers for manufacturing and service industries located in rural Canada.

4.4. Political and legal processes

Well-functioning and well-connected political organizations and facilities make collective decision-making possible, increase motivation of local citizens, provide an important basis for social inclusion, and ultimately improve their ability to anticipate issues and to respond effectively. These effects will be accentuated if there are extensive connections to regional, provincial, national, and international groups. Interaction with political groups at various levels provides information and the opportunity for collective action on issues of local concern. It also provides experience in how to operate within such structures as well as status advantages.

Consideration of these processes should include the specific types of policies and regulations associated with rural locations. The wide range of government policy differentially affects local regions depending on their circumstances. In most cases, these factors should be analyzed in conjunction with local characteristics in order to assess the ways in which general policies have different local effects.

4.5. Social resources and entitlements

Social resources include formal and informal institutions, intercommunity networks, and culture. The existence and nature of the formal institutions in a region are related to job opportunities, access to information both within and outside the community, social support, political influence, and financial capital. Institutions include those in the public and private sector (eg. schools, religious institutions, media, business organizations, hospitals, justice services). Each of these is related to the ability of local

communities to respond to stresses and opportunities. In addition to the more formal organizations, the networks which people make use of on an informal basis provide a means of information transfer, trust development, social control, and contacts both within and outside of the locale. The extent and form of these networks will be related to the learning which can take place and the possible responses to stress and opportunities.

Local communities are linked to those around them in many different ways. This may occur through individual visiting, commuting, shopping, and recreational movement, through trans-community organizations, or through economic or political alliances. The existence and nurturing of these networks is related to the flow of information, development of trust, and access to resources which can alter local community wealth.

The options and choices available to rural people will be significantly affected by the local and regional cultures in which they operate. Local and ethnic-based values, norms, beliefs, and rituals provide an important component of entitlements, training, and opportunities for individuals and local collectivities.

4.6. Local infrastructure

Transportation, communication, housing, and institutional infrastructure provide the means whereby local options and initiatives can be considered and implemented. Easy transportation and communication will affect the ability of those in a community to learn and to trade. The extent and quality of housing can be treated as a resource for local action as much as an outcome. If people live in adequate housing, their energies can more easily be spent on other forms of development. If they have significant education, health, public safety, and welfare institutions available, they will be able to deal with both short-term crises and long-term solutions.

4.7. Spatial and environmental conditions

Two very important distinguishing features of rural places are those related to population density and space. Proximity to urban regions provides a labour force, consumers, institutions, and cultural facilities to the regions which surround them. Being distant from urban regions increases the transportation and communication costs for goods and services from outside and forces a greater self-reliance on the local community. The natural environment creates economic and social opportunities which can alter the options for local growth. They can serve as comparative advantages for trade and services.

5. Discriminant Analysis

These six processes will be used for the empirical analysis of the four leading and lagging dimensions. Unfortunately, not all of the chosen processes are well represented in the data available for the level of analysis desired. Census information is the only source which provides it in sufficient detail to compare units about the size of rural communities, but it is limited primarily to demographic and economic data which touches on only a few of the aspects identified above. Nevertheless, there are sufficient indicators to warrant an initial examination of the broad categories. They are organized in Appendix B into five of the six processes identified above.

Stepwise discriminant analysis⁹ was conducted separately for each of the leading and lagging dimensions considered. Table 4 provides the coefficients for the variables which are statistically significant.¹⁰ Large positive or negative values in each of the columns can be used to identify the variables which are most important for distinguishing leading from lagging CSDs on each of the dimensions. For example, for the employment-income dimension (F1), we find that the percent of couples with two or more members in the labour force has a coefficient of .64 and an old dependency ratio of -.46. The relatively high (and statistically significant) nature of these variables identifies them as important distinguishing characteristics between leading and lagging CSDs on the first dimension. Since positive values for this dimension are associated with leading status, it is also apparent that the percent of couples with two or more members in the labour force is associated with high levels of employment income and high participation rates while high values of the old dependency ratio are associated with lagging status. An extension of this procedure will provide important clues regarding the processes differentiating all four of the dimensions.

TABLE 2: Results of Discriminant Analysis (significant coefficients only)

	SPSS Name	Order	Description	F1: empl income	F2: tenure & family	F3: self employ	F4: housing cost
DEMOGRAPHIC				+lead	+lead	+lead	+lead
1	CS91A20A	3	Population, 1991 (2)			-.23	.32
1	SEXRAT91	498	sex ratio - 1991		.24		
1	DEPYNG91	499	young dependency ratio - 1991	.15	.21	.13	-.21
1	DEPOLD91	500	old dependency ratio - 1991	-.46	.36	.29	
1	PSMDM_91	505	% of single mothers: 91		-.45	-.16	-.15
1	PIMPOP	510	% immigrant population - 91			.20	
1	PEX191	566	% move fr outside Can - 1 yr, 91	.07			
1	PM591	568	% moved (intra+inter+ext) - 5 yr, 91	.16	-.65		.46
1	PEX591	574	% move fr outside Canada - 5 yr, 91				

⁹ Discriminant analysis is a statistical procedure to explore which variables contribute most to the difference between two groups of cases. This will help to answer the general question by answering a more operational one: Which variables contribute most to distinguishing leading from lagging CSDs? To do so, we will identify the CSDs in the top third and bottom third of each dimension and identify the independent variables which do the best job of distinguishing the leading from lagging CSDs on each of those dimensions. Following the usual procedure for discriminant analysis, a 50% random sample of the cases is drawn to calculate the coefficients. This leaves 50% of the cases to use for testing the reliability of the procedure.

¹⁰ The relatively high eigenvalues indicate that for each dimension, the discriminating variables were very effective in differentiating the high and low CSDs. The eigenvalues represent the ratio of between-groups to within-groups sums of squares. High eigenvalues indicate that the variation between the high and low groups is much greater than the variation within each of these groups. This was confirmed by classification analysis. The cases were randomly divided into two sets and discriminant analysis was conducted on one of the sets. The results from the first set were used to classify the second and these results were then compared with the groups to which the second set belonged. Between 89% and 96% of the latter set were correctly classified using the discriminant scores, so the subsequent analysis was conducted using the pooled cases.

	SPSS Name	Order	Description	F1: empl income	F2: tenure & family	F3: self employ	F4: housing cost
1	PUNATTI	580	% of unattached individuals - 1991	-.22	-.23	.48	.17
1	DENS91	611	persons/sq. km - 1991			-.28	
1	PFWCLT6		% of females with children < 6 yrs - 1991				
SKILLS AND TALENTS							
2	PB9ED_91	506	% < grade 9 educ: 91	-.34	.11		-.25
2	PMPSE	508	% males with postsecondary education - 91	.12	.17		
2	PPFSE	509	% females with postsecondary education - 91			.19	.15
2	LF91UMF	606	unemployment rate ratio: ratio m/f 15+ - 91				
2	PCF912LF		% of couples with 2 or more members in LF -1991	.64	.35		.20
WORK STRUCTURE							
3	PIAGR91	511	% agriculture - 91			.91	-.22
3	PIFISH91	512	% fishing & trapping - 91	-.07			
3	PILOG91	513	% logging & forestry - 91			-.23	-.21
3	PIMNE91	514	% mining, quarry, oil - 91	.14		-.14	-.14
3	PIMANU91	515	% manufacturing - 91	.21			
3	PICONS91	516	% construction - 91	-.14			
3	PITRAN91	517	% transportation & storage - 91	.08			
3	PICOMM91	518	% communication & utilities - 91	.08			
3	PIWHOL91	519	% wholesale trade - 91	.11			.08
3	PIRETA91	520	% retail trade - 91		-.12	.09	
3	PIFINA91	521	% finance & insurance - 91	.16			.07
3	PIREAL91	522	% real estate & insurance - 91		.11	.08	
3	PIBUSI91	523	% business service - 91			.09	.11
3	PIGOVT91	524	% government service - 91				-.12
3	PIEDUC91	525	% educational service - 91	.07			
3	PIHEAL91	526	% health & social service - 91	.29		-.08	
3	PIACCO91	527	% accommodation, food, beverage serv. - 91				-.08
3	LF91PTF	607	part time work rate ratio: ratio m/f - 91	-.18	.18		
ECONOMIC CAPITAL							
4	PGLOBAL	746	% Ind. employm exposed to global markets			-.20	
4	PSTABLE	749	% Ind. employm exposed to stable markets				
SOCIAL RESOURCES/INFRASTRUCTURE							
6	LF91DSD	612	% who work in diff. CSD - 1991	.13	.22		.14
6	DMETRO91	627	metropolitan CDs - dummy - beale 1,2,3-91				
6	DNMURB91	628	non-metro, urban CDs - dummy - beale 4,5-91				
6	DNMLUR91	629	non-metro, less urban CDs - dummy - beale 6,7-91				-.09
6	DRURAL91	630	rural CDs - dummy - beale 8,9-91			-.07	-.12
6	DNORTH91	631	northern CDs - dummy - beale 10-91	.10			
6	DNMADJ91	632	non-metro, adjacent - dummy - beale 4,6,8-91			.08	
6	DNMAD91	633	non-metro, not adjacent - dummy - beale 5,7,9-91				
6	DNFLD91	637		-.31	.11		
6	DPEI91	638		-.12		-.07	
6	DNS91	639		-.20			

	SPSS Name	Order	Description	F1: empl income	F2: tenure & family	F3: self employ	F4: housing cost
6	DNB91	640		-.20	.13		
6	DQUE91	641				.31	.24
6	DONT91	642			.26	.24	.55
6	DMAN91	643				.12	
6	DSASK91	644					
6	DALTA91	645		.07		.22	
6	DBC91	646				.12	.18
6	PCCSIGOV	705	% from ccs in govt serv. ind. -91				
6	PCCSIEDU	706	% from ccs in education serv. ind. -91			-.09	
6	PCCSIHEA	707	% from ccs in health and s.s. ind. - 91	-.15	-.10		
	eigenvalues			3.47	2.23	1.78	2.57
	Wilks' lambda			.224	.310	.360	.281
	% original cases correctly classified			97.4%	93.7%	92.2%	94.4%
	% secondary cases correctly classified			96.3%	93.0%	89.3%	93.0%

5.1. Employment income-related dimension

Leading CSDs on this dimension are distinguished by having a high percentage of dual-income couples, a high percentage of workers in health and social service, manufacturing, finance and insurance, and mining or petroleum occupations. They also have a high percentage of migrants over the last five years along with a relatively high young dependency ratio. In contrast, lagging CSDs have high old dependency ratios, a high percentage of people with less than grade nine education, and a high percentage of unattached individuals. They are also more likely to be located in the Atlantic region, especially Newfoundland.

Such results reinforce the position that employment success in rural Canada is a function of several processes related to family and work structures, mobility, and location. Programs which might transform regions from lagging to leading status could include improving the job training and opportunities for women (including support for child care), facilitation of mobility among workers or potential workers, and developing taxation and service policies which support multiple-person households. The latter option is likely to contribute in a number of ways to modifying the status: it would encourage the pooling of incomes, provide the means to share child and health care responsibilities, and help to overcome transportation limitations.

Future research focusing on this dimension is required to investigate several of the processes implied. The distribution and changes of family structure has emerged as an important feature of rural employment income. Dual income families are typically viewed as an urban and professional phenomenon, but they may also be important for the rural context. The conditions supporting or discouraging them in such a context are important to identify, just as the ways in which they facilitate involvement in the labour market. Such research should not overlook the gender implications of part-time and full-time employment in this situation. The discriminant analysis, for example, identifies a high ratio of male part-time to female part-time work as a feature of lagging CSDs. Whether this is due to abnormally high levels of part-time work for men or abnormally low levels of part-time work for women remains to be seen.

5.2. Housing tenure and marriage-related dimension

It is no surprise that this dimension stands in considerable contrast to the first one: factor analysis is designed to seek out such distinctions. At the same time, the discriminant analysis identifies some important similarities in the features distinguishing the leading from lagging CSDs.

Leading CSDs on this dimension are characterized by a relatively high percentage of elderly in two-income households. The sex ratio is also high, indicating those locations where males are in abundance relative to females. They are likely to be in South-Western Ontario, have a large proportion of commuting workers and a high proportion of people under the age of 21. Lagging CSDs, on the other hand have a high percentage of those who moved into the area in the last five years, single mothers, and unattached individuals.

It is little wonder that demographic processes related to family structure and stage in life-cycle play such a prominent role on this dimension. Two-adult households provide an opportunity for house ownership and provide the resources, both financial and human, to get to places of employment. On the other hand, single individuals, especially with the extra burden of dependents, and those who are highly mobile, are less able to establish themselves, reduce housing costs, and thereby reduce the stresses which can undermine marital relationships.

Sites which are lagging on this dimension have the difficult task of providing some of the social support services which can make improved jobs and housing possible. This includes services for those who are mobile, child care for those without financial or family resources, and transportation for those without the ability to commute or shop. These problems face many rural regions of the country.

5.3. Self-employment-related dimension

This dimension is most clearly a reflection of the structure of agriculture, but it includes some elements which vary from the traditional characteristics of the farm population. CSDs loading high on this dimension have a high percentage of the population employed in agriculture, tend to be located in the agricultural regions of Québec, Ontario, and the prairies, and they have a relatively high proportion of elderly people. However, they are also correlated with a high percentage of unattached individuals and immigrants: quite unlike the historical association of agriculture with large families and settled lifestyles.

Consistent with the role of agriculture for this dimension, lagging CSDs have a relatively high population density and size. They also tend to have a high percentage of those in forestry, and are relatively exposed to global markets.¹¹ Sites which are lagging on this dimension are unlikely to have much control over the work structure aspects of this dimension. In most cases they are dependent on the availability of natural resources in the locale. On the other hand, those processes related to labour and trade may be more amenable to influence. The importance of unattached individuals and immigrants suggests that training and services for such people is likely to pay off by increases in self-employment. More detailed research regarding the manner by which this occurs is clearly in order.

¹¹ Industries which are assumed to be relatively exposed to the global economy are: agriculture and related services; fishing and trapping; logging and forestry; mining, quarrying, and oil wells; manufacturing; communication and other utilities; finance and insurance; and business services. Those less exposed to the global economy are: construction; transportation and storage; wholesale trade; retail trade; retail estate and insurance; government services; education services; health and social services; and accommodation, food and beverage services.

5.4. Housing cost-related dimension

This dimension is identified by the value of dwellings and the percentage of households below the Statistics Canada Low Income Cutoff. Leading CSDs have high-cost housing with relatively few families below the Low Income Cutoff. The discriminant analysis suggests that the processes contributing to the different locations on the dimension are not simple. Infrastructure and political processes are important as reflected in the high percentage of leading CSDs in Ontario and Québec. Leading CSDs also have relatively high levels of residential mobility and populations. Finally, the presence of two-income couples reinforces the expectation that housing pressures in leading CSDs are likely to require combined incomes. Lagging CSDs on this dimension are characterized by low levels of education, high proportions of employment in forestry and agriculture, and a relatively high young-dependency ratio.

All of these processes are part of the housing market which remains the central feature of this dimension. Low incomes mean that people cannot afford to live in those areas where the cost of housing is high, just as high housing costs pressure couples to search for additional income.

This dimension highlights one of the important ambiguities in the identification of leading and lagging statuses. Good housing is desirable, as is the reduction in the proportion of those living below the low income cutoff. However, there may be important social and personal costs in attaining this position. If quality housing forces the residents to work longer hours, or forces both parents into the labour market to make payments, we may wish to reassign the leading pole of this dimension. Similarly, low proportions of people below the low income cutoff may reflect stratification or gentrification processes which further exacerbate the current trend toward the separation of the rich and the poor. Policy considerations relating to this dimension must go beyond a narrow focus on it in isolation.

6. Implications of the Discriminant Analysis

These results have important implications for policy-makers, rural citizens, and researchers. In several respects they are similar, but their formulation will vary as a result of the objectives of each group. For this reason, we will discuss them separately.

6.1. Administrators and Policy-Makers

The results suggest several ways in which administrators and policy-makers can influence the leading or lagging status of rural places. The first is through support for education and learning among the rural population. This is especially important for the employment and housing-cost related dimensions since they both hint at processes which relate to human capital characteristics. Such programs should also give attention to the family and gender structure of the population, however. The important role of double incomes and women's income for three of the four dimensions should not be underestimated. Policies and programs which facilitate the entry of women into the labour market are likely to facilitate the move to leading status in rural areas.

A second area of attention is the creation and maintenance of an adequate social and physical infrastructure in rural areas. This will not only facilitate the mobility and employment which play an important part in the status of rural areas, but it will serve to support those who face extra burdens reflecting in the lagging regions examined. Day care, integration programs for those moving into rural areas, health services, and housing support are all suggested as important services which will particularly affect the employment, housing-tenure, and housing-cost dimensions.

A third consideration for policy relates to the importance of work structures as reflected in the self-employment and housing-cost dimensions. These dimensions seem particularly driven by the sectoral status of the region, especially insofar as agriculture and forestry are concerned. Policies directed to these two sectors are therefore likely to have important effects on their leading or lagging status. They are also related to provincial differences, suggesting that coordination of federal and provincial programs will be particularly important.

Fourth, this research highlights the complexity of processes which lie behind these dimensions. Changing one aspect of policy can have positive effects on one dimension while producing negative effects on another. In addition, other NRE project research suggests that the timing for the implementation of programs may be critical in the outcome. For these reasons, policy-makers should be both supporters and users of research. Only by further investigation of these complexities can we hope to maximize the positive effects of our policies.

Finally, an important caveat must be added to these speculations. The empirical analysis on which they are based is limited by the type of data which we have at our disposal. Census data is particularly insensitive to the administrative, institutional, and social network characteristics of the regions. These are all aspects which have been shown by others to be important considerations for the leading and lagging status of rural regions, yet they are missing from our analysis at this stage.

6.2. Local Rural Canadians and Community-Activists

This research also provides important implications for those who live or are active in rural areas. First, it is very important to identify the personal and community objectives as part of local action. Since both the problems and processes are multidimensional, the identification of appropriate action is likely to be difficult. Second, the solutions to the problems identified are unlikely to be single-focused. This means that the organization of community action for addressing these issues must be viewed as a long-term process with the integration of many perspectives from the region.

At the same time, the research carries a positive message. There appear to be several ways in which local community action can make a difference. Although there is evidence for the importance of processes beyond local control, there is also evidence that local programs and activities can significantly affect the leading and lagging status of rural areas. For example, most of the dimensions are related to the level of individual skills and social infrastructure. Both of these are to a significant extent under the control of local citizens. Through the activities of existing groups and networks, local facilities, and regional cooperation, local communities can create circumstances which foster a learning culture and infrastructure. Our analysis points to the special importance of women, the elderly, the young, commuters, and immigrants in this process. Programs which support these types of people and help to integrate them into the community are most likely to improve the status of the region on most of the dimensions we have considered.

The complexity of the dimensions also supports the creation of long-term programs for community learning and reflection. In a context of change and complexity, local communities must not only be able to identify their specific needs and problems, but they must also understand how more general processes of change relate to those specific circumstances. In order to accomplish this, networks of information and learning must be fostered both within and outside of local centres. This can be done through the formation of local learning groups, the fostering of networks between communities and community-development groups, and the establishment of relationships with schools and universities. This process can be supported through the use of such networking tools as the Internet.

6.3. Researchers

There are many challenges for researchers which are created by this research. Most of them can be used as suggestions for the development of future research on these issues.

First, the analysis makes clear that the issue of leading and lagging status is multidimensional. This means that interaction effects from the various processes will be a central part of any analysis, making single focus analysis unlikely to provide significant understanding of the issues. It also supports the wisdom of the NRE sampling frame insofar as it anticipates the interaction effects of the several dimensions on which it is based. The dynamics of rural communities must be approached using comparisons of many types, simultaneously considered, and we must therefore design and conduct our research with the expectation of complexity.

Second, we find that regional variations are important for the outcomes of rural sites, even if the reasons are unclear. Even a gross analysis by region shows that each dimension of leading and lagging status shows a different pattern. This suggests that the determination of leading and lagging status using national standards should be supplemented by regional standards as several points.

Third, this work reinforces the literature which points to the way in which economic processes are embedded in demographic, social, and political ones. Each of the dimensions we considered was differentiated on the basis of family structure, housing, and demographic characteristics along with the traditional economic indicators. Given that the available data did not include administrative, institutional, social, political, and cultural information, we should be extremely cautious in our generalizations and enthusiastic about improving the range and quality of information on rural Canada.

This information should also be more longitudinal in order to assess the more dynamic aspects of the processes which underlie the differences we found at this stage. Preliminary work using the 1986 and 1996 census data suggests that we will find similar patterns for the dimensions of leading and lagging, but the transformations of sites from one status to another has yet to be examined. This should be a high priority of our work.

The complexity of the results to date also reinforces the value of collaborative research as represented by the NRE project. The design of research, the collection of information, and the development of models and modes of analysis which are appropriate for the complex processes being investigated all require the coordination of work on the part of many people. Such coordination requires in addition, the creation of an infrastructure to support the comparison, debate, and communication required. The surprises, insights, and new initiatives which have emerged to far are sufficient evidence that we are on the right track.

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