

Targeting Business Investment in Rural Communities

By

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Abstract

Many agricultural-based communities in the Great Plains region of North America face declining rural populations and shrinking market size to levels eventually insufficient to maintain their functions. In response, rural communities often pursue a variety of business recruitment and retention initiatives including incentives to entice new business to their location.

This paper estimates a model of business-community compatibility designed to assist communities in identifying potential business opportunities, given the community's characteristics. An Industrial Targeting system for Rural Communities (ITRC) model is developed to suggest business investment alternatives, and the pre-requisite conditions for attracting them.

Findings suggest that industrial targeting is a complex, iterative, and often creative exercise and that a detailed investigation of business requirements and community attributes is informative. However, the ITRC model must be used along with other information about local and regional economic and institutional conditions.

Key Words: rural communities, rural development, regional economics, industrial targeting

JEL Classification: O18, O21, R11, R12, R5

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1. Introduction

Resource-based rural communities face major challenges as their traditional economic bases decline. In the case of agricultural-based communities in the Great Plains region of North America, the combination of economies of size and scale in primary agriculture resulting from labour-saving technological change, low income elasticities of demand for the product, and highly (and globally) competitive markets has resulted in a steady decline in labour requirements for a growing total value of production. In the absence of new economic activity in rural areas to absorb the surplus labour released from agriculture, the rural population declines and many rural communities find they no longer have the market size required to maintain their functions. In response rural communities often pursue a variety of business recruitment and retention initiatives including an array of incentives to entice new business to their location.

Many factors combine to determine the success of a new business venture, including whether a particular location is well suited for that economic activity, and whether the new business is appropriate for a particular community. Most communities will have limited resources for recruitment or for the support of a new business, and would therefore benefit from a targeted approach to encouraging business investment. Targeting consists of a selection process based on the probability of business success.

Public policy decisions can influence many of the determinants of firm location decisions. The extent and quality of the transportation network, for example, will affect transport costs and accessibility. Access to education and health facilities will likewise affect location decisions of firms and population. More locally, and more directly influential in terms of community attributes, tax incentives, provision of serviced property, a high quality water supply, and the availability of appropriate waste disposal are policy instruments that can influence location decisions of firms.

This paper presents a tool designed to assist communities in identifying potential business opportunities, given the community's characteristics. An Industrial Targeting system for Rural

Communities (ITRC) model is developed for the province of Saskatchewan to suggest likely business investment alternatives for the communities in the study, and the pre-requisite conditions for attracting them.

An econometric model is used to match apparent industry and market requirements over the 1990s with current community characteristics, to generate a probability of a new business locating in the community over the period from 2006 to 2010. The methodology consists of estimating the model coefficients based on the characteristics of communities for the year 1991, testing the validity of the coefficients on data for the period 1996 to 2001, and then using the model to forecast probable industry investment in the communities for the 2006 - 2010 period. The marginal contributions of individual determinants of growth are also estimated. The model is also used to investigate the possibility of regional cooperation as a means of improving the probability of business starts.

This paper is organized as follows. In Section two, the economic concepts that form the basis for the empirical investigation are presented, followed by a review of selected empirical literature. Sections four and five describe the data sources and methodology and the empirical model respectively. Results are provided in Section six, followed by conclusions.

2. Theoretical Framework

The firm's location decision must be seen in the context of the more general profit maximizing behavior. Profit maximization in a spatial context includes consideration of assembly and distribution costs, as well as the usual input costs and output prices, all of which may vary by location. Two approaches to representing the influence of space may be seen in location theory and central place theory. Location theory defines the basis of the firm's decision regarding site selection and the spatial implications of that decision, assuming the firm's location does not affect market demand. Central place theory provides an explanation of the structure of the system of urban places, which represent local markets for goods and services, assuming that input costs are invariant with location.

Location theory, the integration of the location decision with the micro-economic production theory, is attributed to Moses (1958) whose work was an extension of the triangle space pioneered by

Weber (1929). Within this framework, the optimal location of a firm is a function of the location of the inputs, the market and the transportation costs associated with moving inputs to the production site and outputs to the market. Varying any of these determinants will have an impact on the location of the firm. Refinements to the basic location theory in the Moses-Weber context include the additional considerations on both the supply side and the demand side.

Distance plays a central role in location theory through transport costs. Thisse (1987) points out that distance may be defined in various ways with implications for how it enters into the location decision of a firm, and the characterization of the optimal location for the firm. Others have investigated the conditions for the independence of production and location decisions (Bradfield 1971; Emerson 1973; Woodward 1973; Ziegler 1986). Transportation modes and rates, the variation of rates over space (linear vs. non-linear), the associated fixed costs, which includes transfers where modes change, the possibility of back-haul, and the technologies that reduce rates or render some modes obsolete will all exert an influence.

Other supply-side considerations include the substitutability among factor inputs in producing a given output (Hoover and Giarratani 1985; Isard 1975). The more readily inputs may be substituted for each other, the less constrained the firm will be in its location decision. The size and nature of labour markets as well as the availability and market structure in the other input markets will influence the firm's costs of production, and its location relative to these inputs. More recently, attention has been drawn to the effect of agglomeration economies on production costs and therefore location decisions (McCann 1995). Access to a threshold market is necessary for the realization of agglomeration economies, with this access being dependant on location relative to the concentrations of population or other businesses that represent the markets for the output.

On the demand side, variations in transport costs associated with moving the product to market will affect the delivered price of the product. The spatial demand cone concept shows that at some distance from the market the quantity demanded will become zero as the combination of (fixed) product price and rising transport costs drive the delivered price to a level where no quantity is purchased.

The introduction of spatial price competition, as initially pointed out by Hotelling (1929), will affect market structure and output price, and therefore the firm's location decision. Introducing space explicitly results in competition among a small number of firms. Thus the effective market structure is not perfectly competitive. To reflect the imperfect competition, further refinements in modeling the demand side considerations in the firm's location decision have included the introduction of output price uncertainty and a finer specification of the impact of market structure (Mai, Yeh, Suwanankul 1993; Mathur 1979).

While both supply and demand side aspects of location theory are complex and have each generated a body of literature, a simplified framework is one where a particular production process may be characterized as input-oriented, market-oriented, or footloose. Input orientation implies that the location of inputs exercised the predominant influence; market orientation implies the location of the market exerts a primary influence; footloose industries or firms, as the name implies, are those for whom location is unimportant. Truly footloose industries are difficult to discover, indeed. For practical purposes both demand and supply side influences are typically important in the location decision.

Central place theory is the theory most widely used to explain the number, size, and spacing of centres in a system of urban places. According to this theory, derived from Christaller (1933) and Lösch (1940), the role of the central place is to act as a service and distribution centre for its hinterland, providing its own and the adjacent population with goods and services. The concepts of the demand threshold and the range of the good explain why such functions are provided from central places. The threshold is defined in terms of the minimum level of population and income required to support a particular activity, while the range refers to the maximum area that the activity in question can serve from a particular place. The range is limited because transport costs raise the price of the item as distance from the central place increases.

Since, the threshold and range will differ among various activities, a hierarchical spatial structure of centres exists where the activity with the lowest-threshold requirement is found in all central places. The required number of functions of each type, and thus the number of centres of each size within the

system, is largely a function of total population and income, while the spacing of centres is determined by population density and accessibility.

The spatial competition basis for central place theory is examined by Fujita, Ogawa and Thisse (1988). They conclude that in order for spatial competition models to adequately represent the formation of central places, both substitutable and complementary goods must be considered. Additional considerations are the possibility of multipurpose shopping trips (Eaton and Lipsey 1982; McLafferty and Ghosh 1986) and economies of scale and agglomeration economies (Beguin 1992; Carruthers 1981; Henderson, Kelly, and Taylor 2000). In addition, where an individual community is situated relative to larger centres in the system, influences the attractiveness of that community in a firm's location decision.

Finally, the idea of the Functional Economic Area (FEA) (Fox 1974) can be used to define spatial areas or regions that display a degree of internal cohesiveness and differentiation from the surrounding areas in terms of a potential firm's access to labour (and other inputs) and to a market. This approach emphasizes the interdependence of the location decision of a firm and the residential concentrations. Within rural parts of an FEA, firms may have the opportunity to take advantage of the inputs, services, and markets represented by the larger urban complexes in the FEA (Hansen 1995; Henry, Barkley, and Bao 1997; Galston and Baehler 1995).

3. Empirical Literature Review

The empirical studies of industry compatibility with community attributes focus on some combination of the location factors identified in the theoretical frameworks previously discussed. In industry/business recruitment, the community characteristics are typically taken as given and the industry requirements are matched to those of the community.

Community attributes that attract industry investment to a rural community have been identified in previous research studies by Leatherman et al (2002), Kusmin (1994), and Kusmin et al (1996) for the U.S., and by Stabler and Molder (1992), and Stabler and Olfert (1998) for the rural manufacturing sector in Saskatchewan.

Kusmin (1994), in a review of 35 studies of industrial location in the United States between 1978 and 1991, found that tax and expenditure measures by local and state governments, labour market characteristics, education, market access, demographics, regional characteristics, and industrial composition of the economy were the main explanatory variables. However, many of these studies focused on one or a very limited number of explanatory variables, suggesting a potential bias due to omitted variables.

Transportation infrastructure is important in attracting manufacturing plants where bulk inputs or finished products are to be produced. Access to the major highway corridors, scheduled air service and local airports have a positive influence on attracting manufacturing plants to rural communities (Goode and Hastings 1989). Airports and access to regular scheduled flights are important location variables for large firms with multiple branch plants.

Bollman (1999) analyzed the importance of education for growth in rural Canada in the 1980's, finding that the level of education accounted for 21 to 34 percent of the variability in rural community development.

Goode and Hasting (1989) and Leatherman et al (2002) modeled business location decisions taking into account most of the variables previously identified as important in business establishment. The Northeast Industrial Targeting system modeled the community requirements of 69 manufacturing sectors, using 730 nonmetropolitan communities. The Plains Economic Targeting System (PETS) matches industry requirements of 78 industry sectors to the characteristics for 414 counties in the six Great Plains states as developed by Leatherman et al.

Boyle (1994) reports three criteria for industry targeting to be successful; industries with a realistic potential to expand, the ability of the community to meet an industry's location requirements, and characteristics of the industry being consistent with the community's goals.

4. The Empirical Model

The empirical model estimated here is of the form proposed by Leatherman et al (2002). For each type of business, the increase in the number of establishments of that type is specified as a function of the community characteristics:

$$G_{i,k}^t - G_{i,k}^{t-1} = \beta_o + \beta_q \cdot C_{q,k}^{t-1} + e_i \quad \text{Eqn. 1}$$

where: $G_{i,k}^t$ = the number of businesses of type i in community k , at time period t ,
 $C_{q,k}^{t-1}$ = the community characteristic q in community k in time period $t-1$, and
 e = the error term.

The observations, for each business type, are the communities under study.

The Dependent Variables

The dependent variable, growth in a particular business type, is approximated by an aggregation of Standard Industrial Classification (SIC) codes. The decision rule used for industry aggregation in the ITRC model was the perceived relevance of an industry sector in Saskatchewan and the growth in the number of establishments in a sector over the 1990s. First, the SICs where the number of industry counts increased was determined at the four digit level over the 1995 to 2001 period for Saskatchewan as a whole, and for all communities outside of Regina and Saskatoon (the two metropolitan areas). Second, 2-digit counts were used to group the SICs into basic categories. The SICs grouping are the minimum level of disaggregation possible, given the size of communities, their small number of businesses, and the existing business structure in Saskatchewan communities. The process resulted in 27 four-digit SIC level categories used to aggregate business establishments in Saskatchewan (Table 1).

Business growth for SIC groupings was measured as either a one or zero to represent growth and no growth, respectively. This binary measure was used to focus on the presence or absence of a business type in a particular location. Because the research involves relatively small communities (population of 5,000 or less), the relevant question is more likely to be the probability of a business of a particular type locating there, rather than whether the number of businesses of a particular type can be expanded.

Explanatory Variables

The explanatory variables, Table 2, are similar to those used in previous studies (Goode and Hasting 1989; Leatherman et al 2002). They can be divided into demand-side and supply-side influences. Average income, population density, total population, and rate of poverty are expected to have mostly demand-side influences. The community's proximity to a larger regional economy (FEA) captures access/distance to a market beyond the community boundaries. Higher incomes, and population, would be expected to represent increased local (and regional) demand for consumer products. These same variables, however, may be largely irrelevant for the types of production destined for export markets. The presence of health care facilities (special care home and hospital) are considered demand side influences both because of their amenity value in attracting population and because they may represent specialized markets.

Labour market characteristics such as the level of education, the cost of housing, age, industry mix (work force experience as well as potential inputs) and employment rate describe the supply side characteristics. The particular labour force characteristics that are conducive to attracting industry will vary with the type of business being considered. For example, higher levels of education in the population imply a well-educated and skilled labour force, an apparently positive attribute. On the other hand, these same characteristics probably imply a higher wage rate. For some industries where higher education and skill levels are not critical, the attractiveness of a community may be enhanced by relatively large quantities of low cost, low education-level labour. Similarly, the industry-mix variables may have differential impacts in attracting industry. Higher levels of employment in manufacturing and services may suggest a complement of businesses that could serve as linked industries. On the other hand, a high dependency on agriculture employment may imply a local labour surplus (and low cost labour), especially seasonally, as labour continues to be released from primary production.

Public infrastructure variables are those that can most readily be used as instruments for policy/program changes. Public expenditures on roads, education, safety, and the access to transportation would make a community a more attractive, low cost, place to do business. Tax

requirements would mitigate against this attraction. The relative importance of these variables will be instructive in terms of the community's ability to influence business investment.

Some additional variables that are included require special interpretation. The soil zone variable is expected to influence industry location because it affects the type of agriculture being practiced and may influence the scope for clustering of industry (Stabler and Olfert 1993). The brown soil zone in the province of Saskatchewan is generally characterized by very extensive agriculture leading to a very low population density in rural areas, and farm types that are largely cereal crops or ranching. In the black soil zone, smaller, more diversified farms and livestock are common. Both supply and demand side influences would be expected. Growth in the previous time interval could likewise have a dual influence. One is by way of a trend variable. A healthy growing community may be expected to experience a steady increase in the number of businesses—the growth process is reinforcing. However, in very small places with very limited markets, the appearance of a new business in one period may preclude the possibility of a subsequent similar business start-up.

Selection of Communities

The thirty-three communities used in this study are selected from Stabler and Olfert's 2002 study that classified communities within Saskatchewan's trade centre hierarchy. The choice of communities is the set of Complete Shopping Centres, Partial Shopping Centres and a subset of the Full Convenience Centres—those places that are 'viable' in the trade centre sense (Table 3). Viability is assigned by virtue of having a well-defined and systematic function within the trade centre hierarchy (Stabler and Olfert 2002). The ten largest centers in the province, representing Primary Wholesale Retail Centres and Secondary Wholesale Retail are excluded to focus on *rural* communities. The lowest two levels, Full and Minimum Convenience Centres are largely omitted since they have no systematic trade centre function. An exception is made for a subset of the 72 Full Convenience Centres that were considered most likely to recover their recently lost Shopping Centre status.

5. Data and Methodology

Data Sources

The data were assembled from Statistics Canada, Saskatchewan Government Departments of Learning, Government Relations and Aboriginal Affairs, and Highways and Transportation, and from the Dun & Bradstreet Business Registry. Data on population size and employment by industry classification were collected for the census years of 1991, 1996 and 2001 from Statistics Canada. School division expenses are for the school years starting in 1990, 1995 and 2000. Municipal revenues and expenses were for the years 1990, 1995 and 2000. The dependent variable of industry growth in Saskatchewan was calculated from the Dun and Bradstreet data for the years 1990, 1995 and 2000.

Methodology

Since, the dependent variable is limited (growth =1, no growth = 0), ordinary least squares cannot be used to estimate the parameters. A logistical specification, using maximum likelihood estimation is used to independently estimate equation 1 for each of the 27 industries:

$$\Pr(G_{i,k}^{95-01} = 1) = \frac{e^{a_i + b_{i,1}C_{1,1}^{90} + \dots + b_{i,22}C_{22,k}^{90} + b_{i,23}G_{i,k}^{90-95}}}{1 + e^{a_i + b_{i,1}C_{1,1}^{90} + \dots + b_{i,22}C_{22,k}^{90} + b_{i,23}G_{i,k}^{90-95}}} + u_{i,k} . \quad \text{Eqn. 2}$$

First, industry-specific business growth over the 1995-2001 interval, for the 33 communities, is regressed on the 1990 community characteristics (and the 1990-95 lagged business growth) to obtain the parameter estimates. Second, the estimated β s from equation 2, along with the individual community characteristics for 2001, plus the lagged industry growth variable for 1995 to 2001, are used to calculate the predicted (2006 - 2010) probability of industry i growth in each community. Third, the expected marginal impacts of particular community characteristics are calculated from the estimated equation using data for 2001. The influence of each independent variable on expected growth in each industry is represented by the marginal impact derived from the coefficient estimates. Marginal impact is defined as the expected change in the probability of growth due to a one-unit change in an explanatory variable. For the i^{th} industry the change in the probability of growth for the k^{th} community due to a one unit change in the q^{th} community characteristic is given in equation 3.

$$B_{i,k,q} = \beta_{i,q} * Pr_{i,k} + (1 - Pr_{i,k}) \quad \text{Eqn. 3}$$

Where the betas for each industry are those estimated in Equation 2 and the $Pr_{i,k}$ are those estimated from the predictive equations.

The expected marginal impact of the q^{th} community characteristic on business growth in the i^{th} industry across all (33) communities (Eq. 4) is the simple average of the marginal impacts (Eq. 3).

$$B_{i,q} = \frac{1}{K} * \sum_k B_{i,k,q} \quad \text{Eqn. 4}$$

A measure of the marginal impact of a change in a community characteristic q across all industries and communities is given by equation 5.

$$B_q = \frac{1}{I * K} * \sum_i \sum_k B_{i,k,q} \quad \text{Eqn. 5}$$

The expected marginal impact associated with a binary variable is calculated as the predicted probability of the variable evaluated at one, less the predicted probability evaluated at zero.

6. Results

Predicted Probabilities of Industry Location

Based on the estimated parameters and current community characteristics, the probability of new establishments of each type was estimated for each of the 33 communities in the study. The predicted likelihood of industry location for textiles, printing and publishing, wholesale, other retail, insurance, other business services, and auto and other repair establishments was 99 percent for all communities. The rural communities in the study clearly have the requisite characteristics to support growth in these sectors, many of which are globally growing sectors. Business services, insurance, and retail have enjoyed steady employment growth at the national and provincial levels.

Lower probabilities of industry location were found for construction, lumber/building materials, metal fabricating, electric-gas-sanitation, eating and drinking establishments, real estate, and hotels, other personal services, and beauty/barbershops. The values ranged from .10 to .96. Clearly there are significant possibilities of industry location for these sets of activities for many communities.

None of the 33 communities had any likelihood of industry location for food manufacturing, concrete, other transportation, trucking, communications, building materials, food stores, automotive dealers, management consultants, motion picture establishments, and legal services.

Analysis of Regression Coefficients

Results for the industries that have a probability of location greater than 5 percent but less than 99 percent are presented in Table 4. Average family income is positively related (as expected) to construction. Most of the significant and negative coefficients for construction are unexpected, though both eating and drinking establishments, and hotels would also serve the tourism industry therefore, not dependent exclusively on local spending power.

Population size is positively and significantly related to the probability of business location for a number of industry groups, as expected. Population density, however, has a significant and negative coefficient for a number of industry groups including metal fabrication, electric-gas and sanitary services, eating and drinking establishments and hotels. Perhaps the purchasing power effect is captured by the income and population variables. Proximity to a larger regional market (FEA) exerts some positive influence, as does the presence of health care facilities, though the latter also has some significant and negative coefficients.

Education levels, represented by the percentage of the population over 15 with a high school education, do not reveal the anticipated positive relationship with business location. Industries that do not require a grade twelve certificate for employment or require specific training unique to an industry may be indifferent to the level of high school training in a community. Lower levels of education may also reflect lower wage rates.

Mixed results for the influence of the average value of a house in the community may reflect the fact that a low value would have a positive effect on housing availability, but this is effective only if there is other business development and growth of population. Age, when significant, reveals a negative relationship with the probability of attracting new businesses.

Employment in agriculture is estimated to have a positive influence in all cases where it is significant. To some extent this reflects linked industries as well as a local supply of surplus labour. Employment in manufacturing is estimated to be negatively related to the probability of construction establishments and hotels. The presence of manufacturing employment may represent increased local competition for labour. Similar interpretations may be applied to the estimated coefficients for employment in services.

Infrastructure expenditures have inconsistent coefficients for the industries under investigation though per capita municipal taxation has the expected negative effect on the business location decision for most industries. The estimated relationship with per capita expenditure on education was negative for several industries, counter to expectations. A community's location within an "easy" commuting distance to a commercial airport is significant and positive for lumber, furniture and paper, though significant and negative for construction firms. Many of these businesses will be sensitive to the ease of transportation of inputs and outputs, as well as personnel, though there will be some substitutability between air and road transport. On the other hand, easy road access to larger centres for consumers and labour can have a negative impact on business location.

The soil zone variable is significant and positive for most industries indicating that, all else constant, a community located in the black soil zone has many of the desired characteristics for most industries. The lagged industry growth variable is significant and negative for the growth of several business types, and is never positive and significant. Growth in an industry in a community in one time period appears to reduce the probability of additional establishments of that type in a future period, perhaps due to saturation.

Expected Marginal Impacts

The expected marginal impacts of changes in the values of the explanatory variables are presented in Table 6 for the industries that have a probability of establishment in the period 2006-2010 less than 99 percent but greater than 1 percent. The results shown are for all communities combined. The marginal impacts are calculated from equation 4 for all non-binary variables. The change in the

probability of the industry establishing in a community, in decimal form, for a one-unit change in the explanatory variable is shown in the table.

The interpretation of the marginal impacts is as follows. The expected change in the probability of the location of a construction firm for a one unit change in EmAg would be .927. For example the increase in the probability of industry location for a particular community, for example, Assiniboia, would be 85.6 percent (its estimated parameter value) plus the .927, or 86.527.

When all industries are combined (col. 1), offsetting influences due to the aggregation reduces usefulness of the estimated marginal impacts, but the following interpretation would apply. A \$20/capita increase in road expenditures would, on average, increase the probability of new businesses by .08 percent, a very small impact. On the other hand, a \$100/capita decrease in taxes would, on average, increase the probability of growth in business activity by 3 percent – a relatively large impact. These two variables could be considered instrumental variables, variables over which the community has some discretion.

Marginal impacts of other variables that are not discretionary are, nevertheless, informative as to the magnitude of their influence. The largest positive impact would come from an increase in the percentage of the labour force employed in primary agriculture (31 percent); the largest negative impact (14 percent) comes from an increase in the percentage of the population with a high school diploma. The nature of industry targeting, however, renders the average over all industries less useful than the interpretation of the marginal impact of a particular industry for a community.

To increase the probability of growth in the number of construction firms, communities may have discretion to make the following changes for the desired effects. If they increase expenditures on safety by \$10/capita, on average, the probability of new firms increases by 1.2 percent. Increasing expenditures on roads actually reduces the probability of new construction firms by 1.4 percent and reducing taxes by \$100/capita increase the probability of new construction firms by 5 percent. Adding local airport services is very effective, on average increasing the probability of new construction firms by 40 percent! The large marginal impacts of the industry mix are not directly useful in the sense of the community being able to

influence these values but they are informative in terms of understanding constraints beyond the influence of community leaders. Again, while the average over communities is of interest, for practical application, the more relevant outcomes are those for each individual community.

Aggregation to the Regional Economic Development Authority Level

The effect of communities cooperating with each other and their surrounding rural municipalities to increase the probability of growth was tested. The level of aggregation that was chosen was the Regional Economic Development Authority (REDA), an existing voluntary structure of communities and surrounding rural municipalities in the province of Saskatchewan.

The coefficients generated by the ITRC model were applied to the explanatory variables aggregated over rural space and communities to the REDA level. Only those REDAs where the largest community was one of those in our study were included. The ratio of the likelihood of industry location in the REDA to the likelihood for the largest community in the REDA are presented in Table 6 for those industries where the likelihood of the probability of establishment of an industry *changed*. Ratios greater than one indicate an increased probability of industry location at the regional level, compared with the individual (largest) community.

The probabilities of industry establishment changed at the REDA level for: construction, lumber, metal fabrication, electric-gas and sanitary services, eating and drinking establishments, real estate, hotel, other personal services, and beauty/barbershops. In some cases, these are businesses where the local market is important – construction, eating/drinking establishments, and other personal services. In other cases, like metal fabricating, the access to a larger labour supply will be important. Clearly there is scope for improving successful industry recruitment by using a regional, rather than a community, focus.

7. Conclusions

While the Industrial Targeting System for Rural Communities (ITRC) model presented here identify in a general way the community requisites for business development, this is clearly a complex process. Signs and significance of coefficients for the explanatory variables were frequently at variance

with expectations. The estimated parameters, along with the values for the explanatory variables for a particular community will nevertheless be informative to community leaders in their recruitment efforts. Certainly the business types where the probability of location was 99 percent or greater represent prime targets for recruitment.

The process of identifying community characteristics and business investment requirements is instructive in terms of both the direction and the magnitude of the influences, especially for those variables that are discretionary to the community. At the individual community level, the particular mix of influences and peculiar circumstances may result in outcomes that are quite different from the "average". Entrepreneurship extends well beyond what is captured in the process that is presented in this paper.

Threshold sizes of the local market, labour force, presence of special public and private infrastructure are a pre-requisite for most business location. Where these threshold sizes are not met in the community, these constraints to new business start-ups may be reduced or removed by co-operating with other communities in the region. The availability of labour and the size of the local market for goods and services are two important factors that can be changed by encouraging a regional outlook for business investment. Possible forward and backward linkages that may not be present in a particular community may nevertheless be available in the regional economy of which the community is a part. A regional, rather than a community-specific, approach to attracting businesses may be useful in achieving the attributes that successful business recruitment requires. Appropriate governance structures to permit and facilitate this process are required.

Policy implications of this research point both to the difficulties faced by communities in their economic development efforts and to the complexity of the public policy problem. A reduction in tax rates, though positive in terms of business attraction, is likely to reduce budgets for community amenities. The presence of a quality transportation system facilitates the attraction of a community for surrounding shoppers but also the travel of community residents to other larger centres. In addition to an appropriate economic development plan of senior governments, a coordinated effort among

communities recognizing their individual strengths and weaknesses, the complementarities among them, as well as the ways in which they compete, are essential components of an economic development initiative that will benefit rural communities.

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Table 1: SIC¹ Categories for the ITRC² Model

Abbr.	SIC¹	Industry Description
CONST	1521-1799	Construction
FoodMAN	2011-2099	Food Manufacturing
TEXTILE	2211-2399	Textiles and Apparel
LUMB	2411-2661	Lumber, Furniture and Paper
PRINT&PUB	2711-2795	Printing and Publishing
CONC	2812-3299	Concrete, Chemical, Stone products
MetalFAB	3312-3999	Fabricated Metal Machinery and Equipment
OthTRANS	4011-4172, 4411-4469, 4612-4619	Other Transportation
TRUCK	4212-4231, 4712-4789	Trucking and Transportation Services
COMM	4811-4899	Communications
E G & S	4911-4971	Electric, Gas, and Sanitary services
WHOLE	5012-5199	Wholesale Trade
BUILD	5211-5271	Building Materials and Garden supplies
FoodSTORE	5411-5499	Food Stores
AUTO	5511-5599	Automotive Dealer and Service Stations
OthRETAIL	5311-5399, 5611-5799, 5912-5999	Other Retail
EAT&DRINK	5812-5813	Eating and Drinking Places
INSURE	6211-6499, 6711-6799	Insurance and Holding
REAL	6512-6553	Real Estate
HOTEL	7011-7041	Hotels and Lodging Places
OPS	7211-7221, 7251-7299	Other Personal Services
BEAUTY	7231, 7241	Beauty and Barbershops
OBS	7311-7391, 7394-7399	Other Business Services
MgtCONSULT	7392-7394	Management Consultant, Equipment Leasing
REPAIR	7512-7699	Auto and Other Repair
ENTERTAIN	7813-7999	Motion Pictures and Amusements
LEGAL	8111	Legal Services

1. SIC - Standard Industry Classification.
2. ITRC- Industrial Targeting System for Rural Communities.

Table 2: Explanatory Variables used in the ITRC¹ Model

Abbr.	Variable	Units
AVGINC	Average Family Income	Income (\$)
DENSITY	Population Density	Population per square km
POP	Population	Total Population
FEA	Functional Economic Areas	Weighting system of the 11 FEA ²
POVERTY	Rate of Poverty	% of Population below poverty level
SCH	Presence of a Special Care Home	0 or 1
HOSP	Presence of a Hospital	0 or 1
DIPLOMA	High School Education	% of Population over 15 years with Grade Twelve
HOUSE	Value of Houses	Average value of houses in dollars
AGE	Median Age of Residents	Years
EmAG	Employment in Agriculture	% of workforce employed in Agriculture
EmMAN	Employment in Manufacturing	% of workforce employed in Manufacturing
EmSERV	Employment in Service Sector	% of workforce employed in Services
EmRATE	Employment Rate	% of workforce Employed
ROAD	Amount Spent on Municipal Roads	\$ per capita
EdEXP	Amount Spent on K-12 Education	\$ per capita education expenditure
SAFETY	Amount Spent on Police & Fire	\$ per capita
LocAIR	Local Airport	Presence of a Local Airport
ComAIR	Commercial Airport	Within 100 km of Regina/Saskatoon; 80 km of Prince Albert
HIGHWAY	Located on highway #1 or #16	0 or 1
TAX	Municipal Tax	\$ per capita
SOIL	Soil Zone	Brown or Black Soil Zone
LAGGED	Growth in Industry in prior period	0 or 1

1. ITRC- Industrial Targeting for Rural Communities.

2. FEA – a weighting system based on the population in the 11 Functional Economic Areas as described in Stabler and Olfert 2002.

Table 3: Selected "Viable" Rural Communities in Saskatchewan

Strongest Full Convenience Centres		Partial Shopping Centres		Complete Shopping Centres
Battleford	Hudson Bay	Oxbow	Maple Creek	Assiniboia
Big River	Indian Head	Redvers	Moosomin	Humboldt
Biggar	Kipling	Shellbrook	Outlook	Kindersley
Canora	Leader	Spiritwood	Rosetown	Meadow Lake
Carlyle	Lumsden	Watrous	Shaunavon	Melfort
Davidson	Maidstone	Wilkie	Unity	Melville
Esterhazy		Wynyard		Nipawin

Source: Stabler and Olfert (2002)

Table 4: Coefficients¹ for the 1991 Explanatory variables² from the Model³

	CONST	LUMB	MetalFAB	E G & S	REAL	EAT&DRINK	HOTEL	OPS	BEAUTY
Constant	0.32068	0.32013	0.10887	-3.59746	1.15523	5.34134	2.38912	0.97749	1.56824
AVGINC	0.00002		0.00004			-0.00007	-0.00011	-0.00004	0.00005
DENSITY	-0.00034		-0.00120	-0.00129	-0.00043	-0.00149	-0.00083	-0.00081	
POP	0.00009	0.00004	0.00014	0.00015	0.00008	0.00015	-0.00008		0.00009
FEA	0.15079			0.08157			0.03390	0.15314	-0.05556
POVERTY	-0.01031		0.03269	0.04416	0.01003		-0.02218		0.01890
SCH	-0.80955		-1.50143		-0.39519	-0.60838	0.81186		
HOSP	-0.52402	-0.89913		1.01994		0.36623	0.58286	0.69385	
.....									
DIPLOMA	0.11795		2.76719		0.77951	-3.34082	-2.39352	-5.69128	-2.70537
HOUSE	-0.00002			0.00002		0.00002	0.00003	0.00003	
AGE	-0.06426		0.03096	-0.02739			-0.07603	-0.03254	-0.03178
EmAG	5.90068		6.81615	4.78709	1.89932				5.58396
EmMAN	-5.59302			2.95867			-2.59924	2.62664	
EmSERV	-5.69095	1.22052				-2.05958	-1.78462	-5.17155	2.66684
EmRATE	0.04011								
.....									
ROAD	-0.00458		-0.00276		-0.00077	0.00261	0.00164	0.00203	0.00323
EdEXP	-0.00028		-0.00100		-0.00006		0.00088		0.00039
SAFETY	0.00800	0.00417	-0.00546	-0.00471		-0.00685			
LocAIR	1.99920		1.31085	0.42788	0.31442				
ComAIR	-0.30299	0.20658	-0.38845				0.13824		
HIGHWAY	0.17596		-0.37154					-0.55920	
TAX	-0.00344		-0.00356	-0.00311	-0.00315	-0.00203		-0.00196	-0.00635
.....									
SOIL			0.39804	0.34814	0.11770	0.38033	0.34671	0.65357	0.11006
LAGGED	-0.62959	-0.25978		-0.70724	-0.15632	-0.47188	-0.48074	-0.61142	

1. Bold are significant at the 5% level.

2. AVGINC- average family income. DENSITY- population density/km². SAFETY- per capita \$ spent on police and fire. ROAD- per capita \$ spent on local road maintenance. TAX- per capita municipal taxation. POP- population. EdEXP - per pupil \$ spent on K-12 education. EmAG- % employed in agriculture. EmMAN- % employed in manufacturing. EmSERV- % employed in service sector. EmRATE- % of community employed. POVERTY - % of the community below poverty line. DIPLOMA- % of the population over 15 with grade 12. FEA- Functional Economic Areas. HOUSE- average value of a house. SCH- Special Care Home. HOSP- Hospital. SOIL- Brown or Black Soil zone. LocAIR- existence of a local airport. ComAIR- within 100 km of Regina or Saskatoon or 80km of Prince Albert. HIGHWAY- located on Highway #1 or #16. AGE- median age of the population. LAGGED- industry counts for the 1990-95 period.

3. CONST - construction. HOTEL - hotels & lodging places. BEAUTY -beauty salons & barbershops. REAL - real estate. LUMB- lumber, paper, furniture. OPS - other personal services. EAT&DRINK - eating & drinking places. E G &S- electric, gas & sanitary services. MetalFAB- fabricated metal machinery & equipment.

Table 5: Average Community Expected Marginal Impacts¹ of Explanatory Variables² for each Industry³

	ALL	CONST	LUMB	MetalFAB	E G & S	EAT&DRINK	REAL	HOTEL	OPS	BEAUTY
AVGINC (\$1000)	-0.0018	0.00362		0.00731		-0.01613		-0.02115	-0.00910	0.01015
DENSITY (100/km2)	-0.0081	-0.00541		-0.02222	-0.02886	-0.03507	-0.01039	-0.01648	-0.01872	
SAFTY (\$10/capita)	-0.0012	0.01259	0.01008	-0.01015	-0.01051	-0.01607	0.00000			
ROAD (\$20/capita)	0.0008	-0.01441		-0.01027		0.01227	-0.00375	0.00653	0.00939	0.01394
TAX (\$100/capita)	-0.0292	-0.05402		-0.06611	-0.06929	-0.04764	-0.07648		-0.04536	-0.13680
POP (500)	0.0039	0.00137	0.00104	0.00253	0.00343	0.00343	0.00197	-0.00157		0.00188
EdEXP (\$100/capita)	0.0001	-0.00439		-0.01867			-0.00145	0.01758		0.00839
EmAG	0.3080	0.92796		1.26747	1.06765		0.46101			1.20390
EmMAN	-0.0081	-0.87958			0.65986			-0.51854	0.60791	
EmSERV	-0.1085	-0.89498	0.29553			-0.48353		-0.35603	-1.19690	0.57497
EmRATE	0.0003	0.00631								
POVERTY	0.0010	-0.00162		0.00608	0.00985		0.00243	-0.00442		0.00407
DIPLOMA	-0.1435	0.01855		0.51456		-0.78433	0.18920	-0.47750	-1.31718	-0.58327
FEA	0.0040	0.02371			0.01819			0.00676	0.03544	-0.01198
HOUSE (\$1000/H)	0.0012	-0.00264			0.00453	0.00507		0.00658	0.00630	
SCH	-0.0754	-0.09878		-0.29568		-0.13428	-0.08680	0.16312		
HOSP	0.0217	-0.06863	-0.17520		0.19214	0.07649		0.10572	0.14155	0.07504
SOIL	0.0321			0.07402	0.07764	0.08929	0.02857	0.06917	0.15126	0.02373
LocAIR	0.0498	0.40241		0.17477	0.09275		0.07695			
ComAIR	-0.0030	-0.04885	0.04977	-0.06982				0.02743		
HIGHWAY	-0.0138	0.02692		-0.06627					-0.12599	
AGE (10 years)	-0.0267	-0.10106		0.05756	-0.06109			-0.15167	-0.07532	-0.06852

1. Bold are significant at a minimum 5% level.

2. AVGINC- average family income. DENSITY- population density/km². SAFETY- per capita \$ spent on police and fire. ROAD- per capita \$ spent on local road maintenance. TAX- per capita municipal taxation. POP- population. EdEXP - per pupil \$ spent on K-12 education. EmAG- % employed in agriculture. EmMAN- % employed in manufacturing. EmSERV- % employed in service sector. EmRATE- % of community employed. POVERTY - % of the community below poverty line. DIPLOMA- % of the population over 15 with grade 12. FEA- Functional Economic Areas. HOUSE- average value of a house. SCH- Special Care Home. HOSP- Hospital. SOIL- Brown or Black Soil zone. LocAIR- existence of a local airport. ComAIR- within 100 km of Regina or Saskatoon or 80km of Prince Albert. HIGHWAY- located on Highway #1 or #16. AGE- median age of the population.

3. ALL - the marginal impact of the variable on all industries. CONST - construction. LUMB- lumber, paper, furniture. MetalFAB- fabricated metal machinery & equipment. E G & S- electric, gas & sanitary services. EAT&DRINK- eating & drinking places. REAL - real estate. HOTEL- hotels & other lodging. OPS- other personal services. BEAUTY- beauty salons & barbershops

Table 6: REDA vs Community Ratio¹ of the Likelihood of Industry² Location

REDA	CONST	HOTEL	BEAUTY	REAL	LUMB	OPS	EAT&DRINKE	G & S	MetalFAB
Entrepreneurs	1.29	1.52	1.72	0.99	1.07	1.77	1.35	1.79	0.54
South West	1.09	1.18	1.40	1.89	1.67	2.24	2.97	2.43	2.76
North West	1.22	1.35	1.31	1.32	1.00	1.27	1.64	1.73	1.85
Long Lake	1.21	1.32	1.27	0.91	1.09	1.24	1.00	1.30	0.31
Etomami	1.96	1.25	1.83	1.57	1.06	1.46	1.99	2.16	1.50
West Central	1.12	1.27	1.30	0.88	1.04	1.25	1.57	1.68	0.61
Carlton Trail	1.31	1.30	1.76	1.55	1.30	1.32	1.91	2.11	2.36
Touchwood	1.16	1.34	1.64	1.14	1.06	2.23	2.03	2.35	0.55
Goodspirit	1.80	1.41	2.10	1.20	0.99	1.99	1.60	2.59	1.12
North East	1.23	1.24	1.66	1.38	1.32	1.38	1.48	2.10	1.38
Mid West	1.21	1.41	2.09	1.19	1.11	2.02	2.07	2.21	0.89
Gateway	1.39	1.26	1.43	1.00	0.97	1.53	1.25	2.57	0.72
Cornerstone	1.19	1.25	1.34	0.74	1.28	1.56	1.28	1.92	0.23
Red Coat	1.17	1.49	1.54	1.14	1.29	1.49	1.39	1.92	1.07
South Parkland	1.20	2.16	1.56	1.13	1.00	1.79	1.48	1.84	0.75
Mid Sask	1.18	1.10	2.38	1.26	1.15	1.24	1.23	1.49	1.37
Border	1.06	2.42	1.60	0.76	0.99	5.20	2.66	2.77	0.08
Mainline	1.31	1.24	2.52	1.19	1.08	2.30	2.34	3.89	0.94
Yellow Head	1.39	2.78	1.60	1.33	1.05	2.50	2.94	2.89	1.14
Cyprus Hills	1.20	1.10	1.33	0.75	1.03	1.69	1.33	2.64	0.72
Prairie to Pine	0.88	1.24	1.25	0.57	1.08	1.56	1.50	1.38	0.07
Big Gulley	1.42	1.48	1.19	0.98	1.53	2.10	1.94	1.41	0.15
Battlefords	1.16	1.82	1.60	1.37	1.04	1.57	1.71	2.01	1.67

1. A ratio of greater than 1.00 is interpreted as an increase in the likelihood of location of the industry due to aggregation of explanatory variables across communities and rural space up to the REDA level. The comparison is with the largest community in the REDA.
2. CONST - construction. HOTEL - hotels & lodging places. BEAUTY - beauty salons & barbershops. REAL - real estate. LUMB- lumber, paper, furniture. OPS - other personal services. EAT&DRINK - eating & drinking places. E G & S- electric, gas & sanitary services. MetalFAB- fabricated metal machinery & equipment.