

Co-operatives and Rural Community Population Growth: Evidence from a Canadian Study

by

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Abstract: The social economy holds promise for rural community development through local capacity building, improving political engagement, expanding networks and increasing productivity by reducing transactions costs. In this study the contribution of co-op membership to rural community population growth is estimated, along with standard growth determinants. A unique dataset comprising all non-financial co-ops in Canada is utilized to examine the co-ops' impact at the national and regional levels, as well as by co-op type and industry category. This dataset allows us to conduct the first comprehensive national-level appraisal of the role of cooperatives in affecting community growth, as far as we know. With minor exceptions, the results do not support the expectation that co-ops improve the population growth prospects of rural communities. A possible inference from these results is that the currency (or obsolescence) of social capital may be a factor in its 'productiveness' at the community level. Alternatively, social capital in the form of co-ops may be serving as a substitute for private sector enterprise or other forms of social capital more directly associated with community population retention and growth. There may be scope for co-ops to re-examine their roles in rural community growth.

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1. Introduction

Long term trends including labor saving technical change, globalization and urbanization have tended to disadvantage many Canadian rural communities in terms of population growth (Bollman and Mendelson 1998; Agriculture and Agri-Food Canada 2002; Rothwell et al. 2002). Past empirical studies find that rural community growth is positively affected by the development of an amenity based local economy, close proximity and/or good access to urban agglomeration economies, and other idiosyncratic effects (Deller et al. 2001; Ferguson et al. 2007; Goetz and Rupasingha 2002; Partridge et al. 2007a).

The role of the social economy in community growth and vitality is also receiving attention. The social economy concept, originating in France and well established in the Latin countries of the European Union that have historically had a strong co-operative movement, has more recently emerged in Canada. The government of Canada, in 2007, committed \$132 million in support of the social economy through capacity building, provision of finance, and research support (HRSDC 2007). The social economy builds on and produces social capital, social cohesion and relational assets (OECD 2003; Gui 2001). Sätre Åhlander (2001) proposes that rural development is one of the key areas of interest for the social economy; more specifically, co-operatives may provide a model for rural development. Indeed, she argues that the main factor uniting people in the formation of co-operatives has become the wish to live in a certain region, as opposed to the other motivations such as class or profession-based struggles.

Universal empirically-based conclusions regarding the role of the social economy in community economic development have been somewhat elusive for a number of reasons. The means through which the social economy is proposed to exert influence, according to the OECD definition above, is through building on and producing 'social capital, social cohesion and relational assets.' Major problems of definition have made measurements, and thus rigorous empirical studies, difficult to undertake at best (DeFilippis 2001; Durlauf 2002).¹ While social capital has proven a prolific area of pursuit in the

¹ While the definitional and measurement problems relate to all of social capital, social cohesion, and relational assets, the discussion here is limited to social capital inasmuch as the latter is the most likely way in which co-operative activity will influence community population growth and retention.

literature, Durlauf (2002) concludes that 'observational data to identify substantive forms of social capital is unlikely to be successful, largely because of vagueness in the term. Instead, he argues, economic experiments based on the social psychology literature may be more productive. Glaeser et al. (2002) point to the successful theory and empirical evidence on the *effects* of social capital on economic outcomes, noting that the underlying mechanisms that *create* social capital are largely not understood.

Despite definitional and measurement problems, the social economy, especially through the development and use of social capital has generally been found to have a positive impact on communities (Westlund 2006). Social capital has been proposed as key to healthy communities as a result of its positive externalities through improving political engagement, supporting a range of local organizations, building trust and increasing economic productivity (Knack and Keefer 1997; Putnam and Helliwell 1995; Rupasingha et al. 2000). The ability to engage in community development has been argued to depend in large part upon the existence of social relationships or networks that enable community organization, problem solving, and decision making (Flora 1998).

However, while social capital and the social economy are often viewed as having positive externalities for community well being, there is also the possibility of a negative influence. Just as good networks and mutual loyalties can lead to positive outcomes, there is the risk that exclusion, discrimination against outsiders or corruption might also result (Durlauf 1999; Woolcock 2000). In a rural development context, Sätre Åhlander (2001) points out that productive social capital in one era may become non-productive if the values and knowledge it is based on become obsolete. It is argued that social capital could then actually prevent the development of businesses that operate on the global market, or ones that are capable of adaptation to national and international developments. Glaeser et al. (2001), in an empirical study based on an optimal investment model, conclude that social capital accumulation decisions are driven by individual incentives, not group membership. They point to the importance of understanding the externalities generated by social capital investments, concluding that it is not clear whether social capital should be cast as networks with positive externalities or status with negative externalities. Of course, it could be both depending on the particular community or setting.

The intersection of an interest in rural community population growth and co-operatives in Canada is not surprising since co-operatives have historically had a strong presence in many rural communities (Fulton and Ketilson 1992; Fowke 1973). Gaining momentum after 1900, particularly in the prairie region of Canada, early co-ops were formed to address the problems farmers faced regarding control over buying and marketing their inputs and products respectively. Following these early farmer based co-ops, the co-operative retailing system of Western Canada emerged with roots in the initiatives of rural community-based kinds of co-operatives (Simbandumwe et al. 1991; Fairbairn 2005). Indeed for declining rural communities, the local co-operative is commonly viewed as a community stalwart even in light of other business exits (Fairbairn et al. 1990; Fulton and Ketilson 1992).

Co-operative core values and principles emphasize social responsibility and community development, foundations of the social capital within a community (Restakis and Lindquist 2001). Co-op networks facilitate communication and information flows, can mobilize, train and develop community members and leaders, and link the community and its interests to the broader economy. It may thus be reasonable to posit that those rural communities with strong co-op membership may be relatively more attractive locations for households and firms, both in growing and declining rural communities.

In this paper we empirically estimate the role of non-financial co-op membership in the population growth and retention of rural communities in Canada for the 1991-2001 period. Co-op membership is taken to proxy a component of the social economy, and specifically the role of the social capital embodied in the co-operative institutions. We utilize a unique database provided by the Co-operative Secretariat of Agriculture and Agri-food Canada on the presence and type of co-operatives geo-coded to a very fine level of detail. These data, along with a rich database of detailed community characteristics, including amenities and spatial identifiers, are used to assess the marginal impact of the presence of co-ops in rural community population growth. In sum, these unique data allows us to conduct the first national level assessment of the role of cooperatives on community-level growth (as far as we know). The findings do not generally support the expectation that community population growth is positively affected by higher co-op membership of the residents.

This paper is organized as follows. The next section presents an overview of co-ops in Canada, followed by the theoretical framework that will inform the empirical analysis. Section 4 contains the empirical model. The results are presented in section 5, followed by conclusions and policy implications.

2. The Co-operative Sector in Canada

The co-operative movement found its way into Canada around the 1860s, with 'the well-to-do and the intellectuals' developing co-operative societies to help 'the poor and the ignorant' escape from the socio-economic ills which industrialization and urbanisation brought upon them (MacPherson 1979). The roots of consumer co-ops were found in mutual insurance organisations formed by farmers and co-operative stores in mining communities across the country between the 1860s and 1880s. The first era of these user co-operatives began in Stellarton, Nova Scotia, in 1861 (Quarter 1992; Birchall 1997). Later, a series of other smaller consumer co-ops spread to mining districts in British Columbia, Alberta and to the larger cities of Halifax, Montreal, Winnipeg and Toronto (McPherson 1979). Early agricultural dairy, poultry and egg co-ops in Ontario and Quebec were short-lived (Birchall 1997).

Co-ops serving the farming community, especially in Western Canada, were founded in the early 1900s as farmers tried to counter large corporations in both the marketing of their products and buying inputs. The greatest progress was made in Prairie grain marketing, through the emergence of grain growers associations² in 1906, and by the turn of the 20th century, this group overshadowed the early revolutionary movement by urban workers (Fairbairn 1990).

The equivalent of German credit co-operatives emerged in Canada to address problems of lack of credit support for urban working class citizens. Alphonse Desjardins started the first credit co-operative in Quebec City, 1900. While these co-ops later spread to other parts of Canada, most credit unions, especially in western Canada, were created after 1944 (Craig 1993; MacPherson 1979; Fairbairn 1990).

Canadian worker co-ops are employee-owned co-ops, as distinguished from the European worker co-ops which were consumer co-ops formed by 'workers.' These Canadian worker co-ops never became

² The Grain Growers Company was the biggest of these grains growing association and later became known as United Grain Growers; the latter, in turn became part of Agricore United in 2001.

an integral part of the Canadian working class to the extent of the consumer co-ops formed by British workers. According to Fairbairn (1990), the major disincentive was the sparse concentration of urban workers as well as the heterogeneity in the working class structures.

Housing co-ops, traced back to the early 1970s, originated as a way to increase affordable housing, particularly in Toronto and Vancouver. They were largely enabled by an amendment to the Housing Act³ in 1973 that allowed non-profit corporations to access loans to start house building projects. These funding opportunities, however, ceased in 1996. Other health and social care co-ops such as day care and community co-ops are most prominent in Quebec (Birchall 1997).

In Canada there is a regional dimension in co-op development. For instance, Quebec has the fastest growing worker, housing and consumer co-ops. The province of Saskatchewan has developed one of the most powerful co-operative sectors, mostly consumer and agriculture marketing co-ops, attributable to the degree of government support extended to co-operatives in terms of leadership, advice and legislation (Quarter 1992; Fairbairn 2001). In general, Canada with close to 7,000 co-operatives (including financial co-operatives) and a total membership of over 21million, translating into about 700 co-op memberships per 1,000 population, has the most co-operative economy in the Americas.

In Canada, among the non-financial co-operatives, consumer co-ops comprise the largest share, accounting for 69% of all co-ops, followed by producer co-ops at 19%. The average age of co-ops varies by type: producer co-ops are the oldest (50 yrs.); consumer co-ops have an average age of 43 with worker co-ops the youngest with an average age of 27. By industry agriculture co-ops have an average age of 53 followed closely by retail co-ops at an average age of 51, with housing co-ops being the youngest at 26 years. One implication of the regional diversity is that if co-op intensity affects community outcomes, there is enough geographical variation to produce differing community outcomes across regions.

Spatial differences in the concentration of co-operatives is evident in Figure 1, showing the co-ops (all types, except financial) across Canada. Clearly the co-ops are widely distributed throughout rural

³ The Housing Act, first passed in 1938, provided support by way of low interest mortgages. Political opposition led to the discontinuation of this support, but it was reinstated in the 1970s.

areas of the Prairie region and to a lesser extent in Atlantic Canada while being largely absent in northern Ontario and Quebec as well as interior British Columbia. In southern Quebec and Ontario, the co-op presence appears closely correlated with the distribution of urban centres.

The Canadian Prairies are the northern portion of the Great Plains region of North America characterized by an extensive agricultural base that has experienced labour-reducing technical change. This region's distance from major markets has limited the growth of new economic activities that would utilize the surplus labour, thus leading to long term population declines in the resource-based rural areas. As shown in Figure 1 this region has strong co-op membership throughout its rural areas, a pattern also evident to some extent in the Atlantic region. It is thus of keen interest to test whether those rural communities with higher co-op membership are better able to withstand economic decline, or facilitate the development of new economic bases that would support a local population.

3. Population Growth Theoretical Framework

Community level population growth reflects a multitude of location decisions by firms and households.⁴ While the relative availability of jobs is a key determinant, there is some debate about whether 'people follow jobs' or the other way around (Partridge and Rickman 2003). In either case, the interaction between the location decisions of households and firms is central to modeling population change. Thus, our theoretical framework follows in the tradition of Roback (1982), and subsequent literature (e.g. Beeson and Eberts 1989; Voith 1991, Partridge et al. 2007a,b). Both ongoing external demand and supply shocks and technical change are likely to have spatially differentiated impacts. Responses by households and firms, along with agglomeration economies as articulated by the New Economic Geography (NEG), will define the community level experiences in terms of population growth.

A community's economic strength often relates to whether the region's mix of industries is faring well nationally (Partridge and Rickman 1996; Simon 1998). Resource-based communities have generally suffered a long term decline in labour requirements and therefore population size. Agglomeration

⁴ While it is community population change that is of primary interest, the discussion and framework focuses on the net migration determinants inasmuch as it is this component that is most responsive to changing economic conditions and other community characteristics. Partridge and Rickman (2003) show that population and migration are highly correlated, which is why many migration studies use population change.

economies have been shown to have a strong influence that builds on the existing productivity strengths of larger concentrations of economic activity, though ultimately moderated by congestion effects (Krugman 1991). Along with urban amenities, natural amenities such as a clean environment, beautiful vistas, and abundant recreation opportunities also increase rural community population growth, especially in the U.S. (Deller et al. 2001; McGranahan and Beale 2002; Ferguson et al. 2007).

In addition to agglomeration economies and amenities, the roles of social capital/cohesion have been found to be instrumental in explaining the relative success of some North American communities. Social capital is purported to result in reduced transactions costs, and thus, higher productivity and better economic growth prospects (Flora 1998; Kilkenny et al. 1999; Putnam 1993; Turcotte 2005). These effects are seen as positive externalities of efficient social organization and/or strong networks built on mutual trust and common norms (Durlauf and Fafchamps 2004).

In our framework, households locate to maximize utility in the consumption of traded goods (X), and amenities ($Amen$):

$$(1) U_k = U_k(X_k, Amen_k)$$

where k denotes the community of residence. Traded goods and services consumed in community k may be purchased either in the home community k or in other communities, j . Similarly amenity consumption relies on the stock of amenities in community k ($Amen_k$), as well as those accessible in j proximate regions. Urban amenities include diverse consumption opportunities available in higher-tiered urban areas (Glaeser et al., 2001). The cost of accessing amenities and goods and services outside the community is constrained by the distance between communities k and j ; the consumption of traded goods is also constrained by the budget which is in turn determined by a range of economic variables including labour income (w) both in the home community and communities within commuting distance. Wage levels reflecting productivity will be influenced by the agglomeration economies achieved in each location, as is the case for urban amenities. The level of social capital in community k (SoC_k) contributes to the quality of life, partially through the consumption of amenities but also through reduced transactions costs in finding employment and improving productivity. Likewise, social capital as manifested through co-ops,

for example, can reduce business costs through facilitating access to inputs and the distribution of outputs.

The resulting indirect utility function can be written as:

$$(2) V_k = V_k(\text{Amen}_k, \text{SoC}_k, w_k, d_{kj}).$$

Utility is higher where earnings are higher, where there is better access to an array of employment opportunities, and to more amenities. Social capital can perform a facilitative role in quality of life considerations and in both accessing amenities and in employment opportunities.

When the expected utility is different across communities, households will move from relatively low-utility communities to those with higher expected utility, subject to moving costs. Interregional equilibrium implies equalized utility across space, though adjustments to both demand and supply shocks may occur more or less continuously. Further, information constraints and moving costs mean that migration may only partially adjust in a given period to utility differentials. Thus, net migration (NM) into community k in a representative period relates to the difference in expected household utility between community k and all other communities (V_R):

$$(3) \text{NM}_k = \alpha_k(V_k - V_R), \quad 0 \leq \alpha_k \leq 1,$$

where α is the adjustment rate.

Equations (1)-(3) can be used to derive a reduced form equation for population growth. Population growth in both community k (and other potential locations) is related to the levels of amenities (both natural and urban based), the level of agglomeration economies (Agglom), the underlying local economic and demographic structure (Econ), the stock of social capital, and distances between the communities:

$$(4) \text{PopGr}_k = h_i(\text{Amen}_k, \text{Agglom}_k, \text{Econ}_k, \text{SoC}_k, d_{ij}).$$

Population growth is expected to be positively related to access to agglomeration economies, amenity levels, and the level of social capital; the effect of distance is ambiguous and potentially varying depending on whether there are positive or negative spillovers.

4. Empirical Implementation

The change in population between 1991 and 2001 is expressed as a function of 1991 agglomeration, other economic/demographic, amenity, and co-op membership characteristics:

$$(5) \quad \% \Delta P_{2001-1991} = f(\text{Agglom}_{1991}, \text{Econ}_{1991}, \text{Amen}_{1991}, \text{Coop}_{1992}, \text{pd}, e).$$

This specification of population change being influenced by pre-existing (1991) conditions helps mitigate problems of statistical endogeneity.

Agglom is a vector containing variables that represent the influence of local agglomeration economies, or access to those in nearby urban centers. These include the size of the nearest (or own) CMA, own community population as well as that of the surrounding communities, and distances to urban areas of different sizes (to represent access to agglomeration economies).

The **Econ** vector includes pre-existing community economic and demographic conditions, including the employment rate, industry structure (share of employment in agriculture, other primary and manufacturing), and self employment as a percent of nonfarm employment to represent entrepreneurship. A high initial employment rate will, all else constant, make the community a more attractive location for households. Industry structure is important because some industries are growing more rapidly at the national level.⁵ Also included in the **Econ** vector are: the population share with an aboriginal ancestry, and the percentage of population over 15 years old have a university degree.⁶ Aboriginal share of the population is expected to have a positive effect through natural increase, inasmuch as the rate of natural increase among the Aboriginal population remains considerably higher than the rest of the population (Bollman 2006). Education has an ambiguous effects on population growth. Higher levels of education are expected to result in higher productivity levels, making the community attractive to firms. If they, however, result in higher labour costs they may dampen the community's attractiveness for businesses.

The **Amen** vector is a combination of climate/weather characteristics and 'built' amenities. Among the climate/weather variables considered, only July relative humidity and the average January temperature are included in the final specification. For built amenities we considered the per capita number of police stations, acute care hospitals, cinemas, golf courses, long term acute care hospitals, outpatient clinics,

⁵ Preliminary investigations also included the initial 1991 share below the low income cutoff (or a 'poverty rate'), the unemployment rate, and per capita total income, but these were not included in the final specification due to multicollinearity.

⁶ Initially human capital was represented by the percentage that falls into six education attainment categories (individuals with less than grade 9 to those that have a graduate degree) but only the university degree was retained.

educational institutions and tourism sites, as well as their respective distance measures. Of these, only the per capita number outpatient clinics and number of cinemas were adopted for the final base model.

Of major interest in our investigation is the **SoC** vector representing the role of social capital in community population growth. Initial investigations included the per capita number of co-ops within a community as well as some spatial co-op variables such as co-ops within 100km or 200km, fulltime or part-time co-op employment, communities, and per capita assets of the co-operatives. Out of the broad set of co-operative variables that we explored for possible explanatory power, given the high degree of multicollinearity, the per capita co-op membership and membership from the surrounding communities⁷ were chosen to represent a measure of the intensity of co-op activity in the community. One of the innovative elements of the analysis is the assessment of whether co-ops of different types (worker, consumer and producer), in different regions, or co-ops in different industries (agriculture, retail and service co-ops) have distinct effects on their community population growth.

Provincial dummy variables (*pd*) control for factors that vary by province, such as differences in legislation or regulation, especially with respect to co-operatives. Thus, the explanatory variables are measuring how changes within a province affect relative community growth. The error term, assumed to be normally distributed, is included as *e*. We use the Stata cluster command to adjust for spatial autocorrelation of the error terms within each Census subdivision (see the notes to Table 1).

Co-operative activity seems to be prevalent in rural areas, and some studies have clearly indicated that social enterprises, particularly co-ops, may have allowed many small rural communities to partially offset decline (Fulton and Ketilson 1992; Reimer 1997). For these reasons our model was estimated separately for rural and urban communities.⁸ Urban communities consist of Census Agglomerations (CAs) and Census Metropolitan Areas (CMAs).⁹ Of the 2,601 communities, 2,086 are rural, 515 urban.

⁷ We use surrounding community attributes e.g. per capita membership of surrounding communities, to capture spillover effects.

⁸ In this study communities are classified as rural if they do not geographically overlap part of a census metropolitan area (CMA), or a census agglomeration (CA). Refer to footnote 7 for definitions of CA and CMA.

⁹ According to Statistics Canada, a census metropolitan area (CMA) or a census agglomeration (CA) is an area consisting of one or more adjacent municipalities situated around a major urban core. To form a CMA, the urban core must have a population of at least 100,000. To form a CA, the urban core must have a population of at least 10,000. Accessed at <http://www12.statcan.ca/english/census01/Products/Reference/dict/geo010.htm>.

4.1. Data Sources

Population data and other socio-economic variables obtained from the 1991 and 2001 Statistics Canada Census of Population. Additional data sources, described in Appendix Table 1, include Environment Canada, DMTI database, the Data Library Initiative (DLI) and the Canada Rural Economy Research Lab (CRERL). All the data are aggregated to the Census Consolidated Subdivision (CCS) level, which represent communities for our purposes.¹⁰

Data for co-operative activity variables are obtained from the Co-operative Secretariat, Agriculture and Agri-Food Canada. Two types of data sets were utilized. First, a dataset was accessed from which the Co-operative Secretariat collects information on all registered co-operatives such as status of co-operatives (whether they are still functional or not), the year in which the co-operative was begun, and their types. The second dataset was derived from the annual mail survey of co-operatives with data on co-operative membership, employment, sales and asset endowments; the survey has a 75% response rate.

5. Results

Descriptive statistics presented in Appendix Table 2 show that the average rural CCS lost 0.9 percent of its population between 1991 and 2001, with a much steeper decline of about 2.4 percent between 1996 and 2001. In these two time frames, the average growth in urban CCSs was 11 and 3 percent respectively. Another indicator of the relative economic strength of the two types of communities is the employment rate of 76 percent for urban areas compared with 56 percent for rural. Rural communities, have a higher membership in co-operatives compared to urban CCS. Based on co-op membership, the population affiliated with a co-op is 11 percent for rural communities and 6 percent for urban.

5.1 Base Model Regression Results—All Co-ops

Table 1 presents the base model results for rural and urban communities. Following Partridge et al. (2007a, 2007b), the first three variables describe the effect of the community's remoteness from successively larger urban centres. The first variable is distance from a CMA, that is, an urban community

¹⁰Statistics Canada defines a Census Consolidated Subdivision (CCS) as a grouping of adjacent census subdivisions. Generally urban census subdivisions (towns, villages, etc.) are combined with the surrounding, larger, more rural census subdivision, in order to create a geographic level between the census subdivision and the census division.

with a core population of at least 100K. The other two variables are then the incremental distances for accessing goods and services or employment in successively larger urban centres, first 250-500K and then 500K+. For both rural and (smaller) urban communities, remoteness from larger centres has a consistently significant and negative effect on population growth. For instance, for a one kilometer greater distance that a rural community is located from the core of the nearest CMA (urban center of 100K), population growth is reduced by about 0.022 percentage points. At the mean distance of 139K, this translates into a penalty of 3.1% less growth. The actual size of the negative effect is largest for the incremental distance from the largest category centre, 500K+.

The three population size variables reveal the impact of scale considerations, both of the community itself and of the surrounding and nearby urban communities. First the size of the nearest CMA has a strong positive effect on population growth for rural CCSs, as well as urban CCSs. Second, for rural communities, the size of the aggregated populations of surrounding CCSs also exerts a positive and significant influence. These effects underline the importance of access to urban agglomeration economies and nearby markets for rural communities. The rural community's own population, is however, not statistically significant because regional effects are so dominant.

The key co-op activity variables are represented as the per capita co-op membership in the CCS as well as in the surrounding CCSs. Per capita co-op membership in the community, however, does not have a significant influence on population change in either rural or urban communities, and it has a negative sign. Co-op membership in surrounding communities is also insignificant for urban communities, but highly significant and, contrary to expectations, a negative influence for rural communities. To the extent that co-op membership represents a community's social capital, these results do not reveal a positive influence of social capital on community population growth. Among the possible explanations, it is possible that co-op activity is a substitute for private sector activity or for other forms of social capital, thus making no net contribution to community growth, though it may have other effects. However, the results could be reflecting a great deal of heterogeneity regionally, by co-op type or industry, such that

offsetting significant impacts within the groups may be masked by the aggregate measures. Thus, below we estimate the models for by co-op type, and then by region and industry.

With regard to the economic variables, we find the impact of the employment rate was positive as expected for both samples. The share of people employed in the agriculture sector is inversely related to population growth, as was the case for the share of people employed in the other-primary sector. The negative effect of % manufacturing may be attributable to increased productivity growth.

Education levels, represented by the proportion of the labour force that has a university degree, are statistically insignificant in both the rural and urban samples. A possible explanation is that the role of education may be absorbed in some of the other variables such as the employment rate or industry structure. The share of the population that is of aboriginal origin is positive and significant for both the rural and urban samples, probably reflecting higher rates of natural increase (Bollman 2006). Finally, there is a somewhat mixed pattern regarding the influence of the amenity variables.

5.2 Co-op Activity by Co-op Type

Our data on co-ops allows us to divide co-operatives into consumer, producer, worker, multi-stakeholder, and federation and wholesale types. Because the latter three had very low numbers, they were combined into a single category that we will refer to as 'other' co-ops. Consumer co-ops make up the bulk of the co-operatives, 2,863 of the 3,633 total co-ops in the study. These co-ops, owned by their customers, provide services to households such as retail services, health care, and housing among others. Membership in consumer co-ops constitutes more than 80% of the total members (1,961,189 of 2,334,919). The 615 producer co-ops are owned mostly by farmers to process and/or to market their products. Producer co-ops may also provide supplies or services for their members.

Worker co-ops are owned by employee members and may be found in all economic sectors, but at 106 in number, are less common than other types of co-ops. They are most prevalent in the forestry industry. The last category comprised of the combined wholesale (4), federations (42) and multi-stakeholder co-ops (3) are basically co-ops whose membership includes different categories of members

who share a common interest in the organization. That is, a variety of stakeholders unite their efforts to provide a service. For instance, wholesale co-ops give their local co-ops the benefit of mass buying.

Results by co-op type, presented in Table 2, show that in neither rural nor urban communities do we find membership in worker or producer co-ops positively influencing population growth. Nor are there positive neighborhood effects accruing from worker and producer co-op membership in the surrounding communities. Producer co-operatives in rural communities may have been formed to offer solutions to various producer marketing and input-supply problems at the beginning of the 20th century, but their effect on population growth, if ever present, appears to have dissipated. In the case of the more recently developed worker co-ops, their presence is also not contributing to current net community attractiveness. The current role of these co-ops in their communities appears to be independent of factors that would attract population to their communities, or mediate declines in those rural resource-dependent communities experiencing long term declines.

Community consumer co-op membership, accounting for more than half of all co-op membership in Canada, is insignificant in rural community population growth, and negative and significant in urban communities. The results do not support a positive role for these co-operatives providing retail, health care or housing services, in community population growth or retention over the period under investigation. While these co-ops, as a form of social capital in their communities, may perform functions for their memberships, their role is not one that translates into improved population growth or retention. Consumer co-op membership in surrounding communities has a positive influence on rural community population growth, suggesting the possibility of some positive regional spillovers.

Unlike other co-op types, we observe positive and significant effects of per capita membership in the ‘other’ co-ops category on rural community population growth. However, given the heterogeneous nature of this group and the small numbers (49 aggregated), these results must be treated with caution.

5.3 Co-op Activity by Region and Industry Category

There is a possibility that the broader economic regions in the country represent fundamentally different settings for economic growth and thus, perhaps for the role of co-ops. In this regard we

conducted an analysis of the determinants of population growth by dividing the data into five regions¹¹: British Columbia (BC); Saskatchewan, Manitoba and Alberta (Prairies), Newfoundland and Labrador, Prince Edward Island, Nova Scotia and New Brunswick (Atlantic Canada), Quebec and Ontario.

The results for rural and urban communities (not shown) revealed an impact of co-op membership by region very similar to that at the national level, with few variations. For example, per capita co-op membership had a positive though not a significant impact on community population growth for both the rural and urban samples in the prairie region, where the per capita co-op membership is the highest in Canada. Another variation, co-op membership had a positive coefficient in the urban Quebec sample.

The results (not shown) for community population growth determinants by industry category (agriculture, retail, housing, and 'Other services') also confirmed national level results with few exceptions. For example, higher per capita co-op membership in retail co-ops has a *positive* impact on population growth in urban communities, as does co-op membership in "Other service" co-ops in surrounding communities; housing co-op membership in surrounding communities exerts a *positive* influence on community growth in rural areas only. By industry, as was the case at the aggregate national level, for co-op types, and for regions, co-ops do not appear to generate positive externalities in terms of making their rural communities more attractive places for population growth and retention. As many rural communities face population loss or stagnation as their economic bases decline and population concentrates in urban centres, there is no evidence that higher levels of social capital as represented by co-op membership ameliorates this trend.

5.4 Sensitivity Analysis

Table 3 replicates the national results from Table 1 (cols. 1, 5), along with a number of sensitivity runs. Even though 1991 predetermined values for the explanatory variables are used in our explanations of subsequent population growth, some endogeneity concerns may remain. Introducing longer lags further reduces the potential concerns of simultaneity or reverse causality between the population growth and the

¹¹ Aside from these being standard economic regions in Canada, there are also province-specific characteristics; for example, the co-operative sector in Quebec is organized differently than the rest of Canada (Fulton, 1990).

explanatory variables including co-op activity. Population change 1981-1991 was added ($\% \Delta 81-91 \text{pop}$) as an explanatory variable (cols. 2, 6), to assess whether past or persistent population growth trends are driving our results. That is, if co-ops are predominant in communities that have long been undergoing population decline, the lagged dependent variable should capture this effect, leaving other explanatory variables, including co-op activity to pick up their own marginal contribution. The results in Table 3 showed that no such pattern.¹² We thus infer that the persistent lack of significance of the co-op membership variable is not due to co-op activity being associated with communities experiencing long term population decline.

Another sensitivity analysis was undertaken to assess if lagging the socio-economic variables by 10 years might affect the results. In this regression the 1991 to 2001 population change in the base model is expressed as a function of 1981 economic variables (cols. 3, 7). Following Glaeser et al. (1995), such deep lags, especially the share of individuals with a completed high school education, influence later growth. The results suggest no major differences from the base model, with the possible exception that there is an increase in significance, especially of agglomeration factors. We attribute this to the fact that the impact of these variables on population growth may take a long time to be fully realized.

A final sensitivity estimation to test the importance of a lag structure was undertaken using 1996-2001 change in population as the dependent variable with 1991 explanatory variables (cols. 4, 8). No positive link between co-op activity and community population growth emerged.

6. Conclusion

Community commitments, trust and networks that are characteristic of social capital and consistent with the development of co-operatives may be expected to make rural communities more attractive to households and businesses. However, in our models of population change, after controlling for prevailing socio-economic and spatial attributes of the communities, there is little evidence of this. In national, as well as co-op type and regional and industry type models, co-op membership does not make a positive

¹²The correlation between 1981-91 population change and per capita membership was .14 for rural CCSs and .12 for urban.

contribution to rural community population growth with a couple of minor exceptions.

The social economy has recently been hailed in Canada as positive contributor to community economic growth and vitality. It is proposed that through building on and producing social capital, the social economy may be particularly important for rural development. Co-operatives are often proposed as the vehicle by which this may occur. Findings to the contrary in our study suggest there is need for further research. One possible area of pursuit is a better articulation of the nature of the social capital embodied in the social economy structures. It may be that over time some social capital becomes a barrier to innovation or to broadening the markets or capacity beyond the particular site of the social capital. Another area for further research is the possibility that co-ops represent a substitute for private sector economic activity; further research could assess whether co-ops crowd out private enterprises with specific attention to the types of sectors.

Within the aggregate of social capital, co-ops may substitute for other types of social capital that may be more influential in making communities attractive for population growth and retention. More research is required to investigate why co-ops are not playing this role in their communities. Indeed, it is possible that co-ops could have other social goals that take precedence over goals related to broader community development. A similar assessment using co-ops in other countries would also be useful because their histories and goals may differ—e.g., France or the United States. Finally, in terms of this particular study, the addition of financial co-operatives would be of value in assessing more completely the role of co-operatives in community economic development.

References

- Agriculture and Agri-Food Canada. 2002. Canadian *Rural Population Trends*. Rural Research Note. Government of Canada. Access at http://www.rural.gc.ca/research/note/note1_e.pdf.
- Beeson, P.E and R.W. Eberts. 1989. Identifying Amenity and Productivity Cities using Wage and Rent Differentials. *Review of Economics and Statistics* 71(3): 443-452.
- Birchall, J.1997. *The International Co-operative Movement*. Oxford, UK: Manchester University Press.
- Bollman, R.D. 2006. Rural Canada: Drivers and Riders. Presentation to the Growing Regions Conference, July 2006, Brisbane, Australia.
- Bollman, R.D and R. Mendelson. 1998. Rural and Small Town Population is growing in the 1990s. *Rural and Small Town Canada Analysis Bulletin*, Vol. 1 No 1 Catalogue no.21-006 XIE. Accessed at <http://www.statcan.ca/english/freepub/21-006-XIE/21-006-XIE1998001.pdf>.
- Craig, G.J.1993. *The Nature of Co-operation*. Montreal, Canada: Black Rose Books.
- DeFilippis, J. 2001. The Myth of Social Capital in Community Development. *Housing Policy Debate* 12(4): 781-806.
- Deller, Steven C., Tsung-Hsiu (Sue) Tsai, D.W. Marcouiller and Donald B.K. English. 2001. The Role of Amenities and Quality of Life in Rural Economic Growth. *American Journal of Agricultural Economics* 83(2): 352-65.
- Durlauf, Steven N. 1999. The Case "Against" Social Capital. Wisconsin Madison - Social Systems, Working paper 29. Social Systems Research Institute: University of Wisconsin, Madison.
- Durlauf, Steven N. 2002. On the Empirics of Social Capital. *Economic Journal* 112(283): 459-479.
- Durlauf, Steven N. and Marcel Fafchamps. 2004. Social Capital. NBER Working Paper Series 10485. NBER: Cambridge, MA.
- Fairbairn, B. 2005. Canada's Co-operative Province. Individualism and Mutualism in a Settler Society 1905-2005. Occasional Paper Series. Saskatoon, SK: Center for the Study of Co-operatives.
- Fairbairn, B. 2001. The Co-operative Tradition in Canada. In Restakis (eds).*The Co-op Alternative. Civil Society and the Future of Public Services*. Toronto, ON: Institute of Public Administration of Canada.
- Fairbairn , B. 1990. Social Bases of Co-operation: Historical Examples and Contemporary Questions. In Fulton. M (ed), *Co-operative Organizations and Canadian Society: Popular Institutions and Dilemmas of Change*. Toronto, ON: University of Toronto Press.
- Fairbairn, B., C. Axworthy, M. Fulton, L. Ketilson and D.Laycock. 1990. Co-operative Institutions: Five Disciplinary Perspectives. In Fulton. M (ed), *Co-operative Organizations and Canadian Society: Popular Institutions and Dilemmas of Change*. Toronto, ON: University of Toronto Press.
- Ferguson, M., K. Ali, M. R. Olfert and M.D. Partridge. 2007. Voting with their feet: Jobs versus Amenities. *Growth and Change* 38(1): 77-100.
- Flora, J.L.1998. Social Capital and Communities of Place. *Rural Sociology* 63(4): 481-506.

- Fowke, V.C. 1973. *The National Policy and the Wheat Economy*. Toronto, ON: University of Toronto Press.
- Fulton, M and L.M. Ketilson. 1992. The Role of Co-operatives in Communities: Examples from Saskatchewan. *Journal of Agricultural Co-operatives* 7: 15-42.
- Glaeser, Edward L., David Laibson and Bruce Sacerdote. 2002. An Economic Approach to Social Capital. *The Economic Journal* 112: F437-58.
- Glaeser, E.L., J. Kolko, and A. Saiz. 2001. Consumer City. *Journal of Economic Geography* 1: 27-50.
- Goetz, Stephan and Anil Rupasingha. 2002. High-Tech Firm Clustering: Implications for Rural Areas. *American Journal of Agricultural Economics* 84(5): 1229-36.
- Gui, B. 2001. The Economic Rationale for the Third Sector. *Annals of Public and Co-operative Economics* 62(4):551-572.
- Human Resources and Social Development Canada (HRSDC). 2007. Social Economy: Questions and Answers Accessed at http://www.hrsdc.gc.ca/cgi-bin/hrsdcrhdsc/print/print.asp?Page_Url=/en/cs/comm/sd/social_economy.shtml
- Kilkenny, M., L. Nalbarte, and T. Besser. 1999. Reciprocated community support and small town, small business success. *Entrepreneurship and Regional Development* 11: 231-246.
- Knack, S and P, Keefer. 1997. Does Social Capital Have an Economic Payoff? A Cross-Country Investigation. *The Quarterly Journal of Economics* 112:1251-1288.
- Krugman, P. 1991. Increasing Returns and Economic Geography. *Journal of Political Economy* 99: 483-499.
- MacPherson, I. 1979. Each for All. A History of the Co-operative Movement in English Canada, 1900-1945. Carleton Library Series #116. Ottawa, ON: Carleton University Press.
- McGranahan. D. and C.L. Beale. 2002. Understanding Rural Population Loss. *Rural America* 17: 2-11.
- OECD. 2003. *The Non-Profit Sector in a Changing Economy*. Paris, France: OECD Publications.
- Partridge, M., M. R.Olfert., A. Alasia. 2007a. Agglomeration or Amenities: Canadian Cities as Engines of Growth. *Canadian Journal of Economics* 40(1): 39-6.
- Partridge, M.D., D.S. Rickman, K. Ali and M.R. Olfert, 2007b. The Landscape of Urban Influence on U.S. County Job Growth, *Review of Agricultural Economics* 29(3): 381-389.
- Partridge, M.D. and D.S. Rickman. 2003. Do We Know Economic Development When We See It? *Review of Regional Studies* 33: 17-39.
- Partridge, M.D. and D.S. Rickman. 1996. The Role of Industry Structure, Costs, and Economic Spillovers in Determining State Employment Growth Rates. *The Review of Regional Studies* 26: 235-264.
- Putnam, R. 1993. The Prosperous Community – Social Capital and Public life. *The American Prospect* 4(13): 35-42.

- Putnam, R.D and J.F Helliwell. 1995. Economic and Social Capital in Italy. *Eastern Economic Journal* 21(3): 295-307.
- Quarter, J. 1992. *Canada's Social Economy. Co-operatives, Non-profits and Other Community Enterprises*. Toronto, ON: James Lorimer and Company Publishers.
- Reimer, B. 1997. Informal Social Networks and Voluntary Associations in Non-Metropolitan Canada. In Rounds (ed) ,*Changing Rural Institutions. A Canadian Perspective*. Canadian Rural Restructuring Foundation in cooperation with the Rural Development Institute, Brandon University.
- Restakis, J and E.A. Lindquist eds. 2001. *The Co-op Alternative, Civil Society and the Future of Public Services*. Toronto, ON: The Institute of Public Administration of Canada.
- Roback, J.1982. Wages, rents, and the Quality of Life. *The Journal of Political Economy* 90 (6):1257-78.
- Rothwell, N., R.D. Bollman, J. Tremblay and J. Marshall. 2002. Migration to and From Rural and Small Town Canada. *Rural and Small Town Canada Analysis Bulletin 3 (March)*. Catalogue no. 21-006-XIE.
- Rupasingha, A., S. J. Goetz and D. Freshwater. 2000. Social Capital and Economic Growth. A County-level Analysis. *Journal of Agricultural and Applied Economics* 32(3): 565-572.
- Sätre Åhlander, Ann-Mari. 2001. The Social Economy: New Co-operatives and Public Sector. *Annals of Public and Co-operative Economics* 72(3): 413-433.
- Simon, Curtis (1998) Human Capital and Metropolitan Employment Growth. *Journal of Urban Economics* 43: 223-243.
- Simbandumwe, L., M.Fulton and L.H.Ketilson.1991. The Co-operative Sector in Saskatchewan. A Statistical Overview. Occasional Paper Series. Saskatoon, SK: Centre for the Study of Co-operatives.
- Turcotte, M. 2005. Social engagement and civic participation: Are rural and small town populations really at an advantage? *Rural and Small Town Canada Analysis Bulletin. 6:* Catalogue no. 21-006-XIE.
- Voith, R. 1991. Capitalization of Local and Regional Attributes into Wages and Rents. Differences across Residential, Commercial and Mixed-use Communities. *Journal of Regional Science* 31 (2):127-145.
- Westlund, Hans. 2006. *Social capital in the Knowledge Economy: Theory and Empirics*. Advances in Spatial Science series. Berlin and New York: Springer.
- Woolcock, M .2000.The Place of Social Capital in Understanding Social and Economic Outcomes. Development Research Group, The World Bank and Kennedy School of Government, Harvard University. Access at <http://www.oecd.org/dataoecd/5/13/1824913.pdf>

Figure 1: Per Capita Co-op Membership at the CCS Level, Canada, 2006.

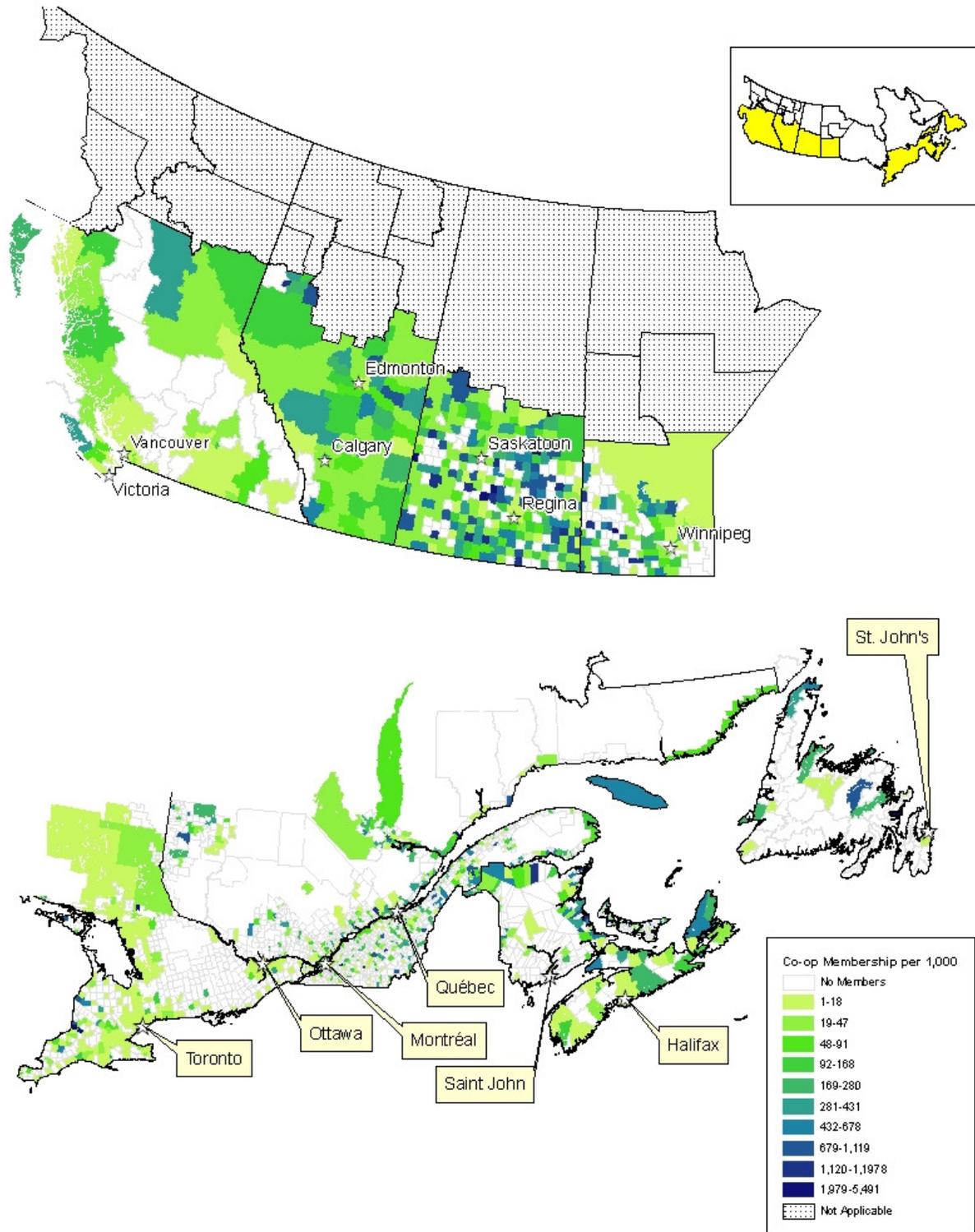


Table 1: Rural and Urban 1991-2001 % Δ Population, Base Model Regression Results^{a,b}

Explanatory Variable ^c	Rural Model	Urban Model
Dist_cma_100k	-0.0002*** (-4.01)	-0.00029*** (-4.32)
Incre_dist_250k	-0.00007* (-1.66)	-0.00011** (-2.29)
Incre_dist_500k	-0.00023*** (-2.85)	0.00009 (0.58)
Nearest/own_cmapop_91	1.64E-08** (2.18)	1.52E-08** (2.35)
Pop_surr_91	2.80E-07*** (3.93)	-9.46E-09 (-0.84)
Own_ccsmapop_91	5.44E-07 (0.51)	-8.02E-08 (-1.61)
Percapita_member	-0.00879 (-1.02)	-0.01513 (-0.48)
Percapita_mem_surr	-0.03992** (-2.04)	0.03688 (0.92)
Employ_rate	0.25442*** (5.70)	0.3441*** (3.93)
Share_agric_employ	-0.41137*** (-7.32)	-0.4468** (-2.21)
Share_prim_employ	-0.52944*** (-4.89)	0.21609 (0.83)
Share_manu_employ	-0.26696*** (-3.50)	0.9266 (0.4)
%nonfarm_self_employ	0.06685 (0.73)	0.5148** (2.11)
Share_unidegree	0.09429 (0.5)	-0.07118 (-0.46)
Share_aborig	0.15736* (1.68)	0.32286** (2.05)
July_rh	-0.00003 (-0.09)	0.00093* (1.98)
Jan_temp	0.00262** (2.61)	-0.0021* (-1.97)
Percapita_cinema	334.43* (1.95)	34.69 (0.9)
Percapita_outpatient_clinic	10.40 (0.63)	-133.53 (-0.76)
Constant	-0.02004 (-0.33)	-0.20068** (-2.56)
Observations	1995	510
R-squared	0.3163	0.4786

^aNorthern Territories are excluded from the sample; Robust t-statistics are reported in parentheses. To adjust for spatial autocorrelation, the t-statistics are adjusted for the clustering of the error terms within a given Census Division. Census divisions are 288 regions (in 1996) that contain about 10 CCSs on average. Generally, they are constructed to approximate a cohesive regional grouping. *, ** and *** denote significance at 10%, 5% and 1% respectively. X denotes that provincial dummies are included in the model; ^cSee Appendix Table 1 for variable definitions.

Table 2: Rural and Urban 1991-2001 % Δ Population, Regression Results, by Co-op Type ^{a,b}

Explanatory Variables ^c	Rural				Urban				
	Consumer	Producer	Worker	Other	Consumer	Producer	Worker	Other	
Dist_cma_100k	-0.0002*** (-4.04)	-0.0002*** (-4.12)	-0.0002*** (-4.00)	-0.0002*** (-4.26)	-0.0003*** (-3.68)	-0.0003*** (-4.32)	-0.0003*** (-4.37)	-0.0003*** (-4.37)	
Incre_dist_250k	-0.00007* (-1.69)	-0.00008* (-1.75)	-0.00008 (-1.66)	-0.00008* (-1.74)	-0.00011** (-2.57)	-0.0001** (-2.21)	-0.00011** (-2.23)	-0.0001** (-2.23)	
Incre_dist_500k	-0.00024*** (-2.78)	-0.0002*** (-2.72)	-0.00022** (-2.62)	-0.0002*** (-2.75)	0.0001 (0.6)	0.00009 (0.56)	0.00008 (0.46)	0.00009 (0.57)	
Nearest/own_cmapop_91	5.50E-07** (2.19)	5.2E-07** (2.17)	5.1E-07** (2.16)	1.67E-08** (2.22)	1.51E-08** (2.34)	1.48E-08** (2.29)	1.47E-08** (2.30)	1.50E-08** (2.30)	
Pop_surr	2.3E-07*** (3.97)	2.8E-07*** (3.90)	2.8E-07*** (3.88)	2.73E-7*** (3.72)	-9.22E-09 (-0.76)	-8.13E-09 (-0.74)	-7.94E-09 (-0.76)	-8.56E-09 (-0.75)	
Own_ccsipop_1991	5.50E-07 (0.51)	5.21E-07 (0.48)	5.10E-07 (0.47)	4.93E-07 (0.46)	-7.96E-08 (-1.46)	-7.03E-08 (-1.52)	-7.94E-09 (-1.53)	-7.54E-08 (-1.52)	
Percapita_cons_member	-0.0107 (-1.04)				-0.0968*** (-2.95)				
Percapita_cons_mem_surr	0.03908* (1.75)				-0.46498 (-0.68)				
Percapita_prod_member		-0.01099 (-0.73)				-0.2247*** (-3.90)			
Percapita_prod_mem_surr		-0.00376 (-0.05)				0.13598 (0.82)			
Percapita_worker_mem			0.02953 (0.47)				-5.08822 (-1.27)		
Percapita_worker_mem_surr			-0.8454** (-2.54)				-0.20686 (-0.12)		
Percapita_other_member				4.9578*** (3.44)				0.0204 (0.19)	
Percapita_other_mem_surr				1.48998*** (4.19)				-0.01287 (-0.25)	
Employ_rate	0.2552*** (5.73)	0.2542*** (5.79)	0.2531*** (5.73)	0.2524*** (5.68)	0.3413*** (3.96)	0.3463*** (3.99)	0.3415*** (3.87)	0.3422*** (3.82)	
Share_agric_employ	-0.4149*** (-7.29)	-0.4132*** (-7.59)	-0.4160*** (-7.48)	-0.416*** (-7.35)	-0.4602** (-2.29)	-0.4462** (-2.18)	-0.4352** (-2.16)	-0.4313** (-2.15)	
Share_prim_employ	-0.5261*** (-4.85)	-0.5289*** (-4.92)	-0.5273*** (-4.94)	-0.5164*** (-4.76)	0.19423 (0.75)	0.20121 (0.77)	0.19619 (0.76)	0.2097 (0.81)	
Share_man_employ	-0.2694*** (-3.53)	-0.2678*** (-3.53)	-0.2702*** (-3.55)	-0.2759*** (-3.59)	0.06488 (0.28)	0.10473 (0.46)	0.12038 (0.53)	0.11051 (0.48)	
%nonfarm_self_employ	0.06592 (0.71)	0.06384 (0.69)	0.06162 (0.67)	0.06193 (0.67)	0.5188** (2.11)	0.5227** (2.14)	0.5048** (2.07)	0.5185** (2.14)	
Share_unidegree	0.09669 (0.51)	0.1063 (0.56)	0.10652 (0.56)	0.11331 (0.6)	-0.06925 (-0.45)	-0.08084 (-0.52)	-0.06912 (-0.44)	-0.0671 (-0.42)	
Share_aborig	0.15896* (1.70)	0.16306* (1.74)	0.16293* (1.75)	0.15442 (1.65)	0.29532* (1.83)	0.32172** (2.03)	0.32199** (2.03)	0.32309** (2.04)	
July_rh	-0.00003 (-0.08)	-0.00004 (-0.13)	-0.00003 (-0.07)	0.00001 (0.04)	0.00094** (2.00)	0.00095** (2.04)	0.0009* (1.92)	0.00093** (2.01)	
Jan_temp	0.00262** (2.60)	0.00262** (2.52)	0.00258** (2.49)	0.0025** (2.45)	-0.00182 (-1.64)	-0.0022** (-2.09)	-0.00214** (-2.00)	-0.0021* (-1.98)	
Percapita_cinema	334* (1.98)	331* (1.96)	333* (1.98)	213 (1.37)	30 (0.77)	28 (0.79)	43 (1.08)	41 (1.05)	
Percapita_outpatient	10 (0.63)	9 (0.53)	9 (0.52)	9 (0.53)	-167 (-0.98)	-138 (-0.78)	-150 (-0.87)	-149 (-0.87)	
Observations	1994	1994	1994	1994	510	510	510	510	
R-squared	0.3159	0.3148	0.3157	0.3185	0.4834	0.4813	0.4787	0.4777	

^{a-d} refer to Table 1; Constant term and provincial dummies included, not shown.

Table 3: Rural and Urban 1991-2001% Δ Population, Sensitivity Analysis Results^{a,b}

Variables ^c	Rural				Urban			
	91-01	Lagged pop change 81-91	Lagged Econ vars., '81	Dep. var. 96-01% Δ	91-01	Lagged pop change 81-91	Lagged Econ vars., '81	Dep. var. 96-01% Δ
Dist_cma_100k	-0.0002 (-4.01)***	-0.0002 (-3.87)***	-0.0002 (-3.81)***	-0.0001 (-4.18)***	-0.00029 (-4.32)***	-0.0003 (-4.40)***	-0.0004 (-4.16)***	-0.0001 (-2.56)**
Incre_250k	-0.00007 (-1.66)*	-7.40E-05 (-1.69)*	-8.70E-05 (-1.99)**	-2.20E-05 (-0.65)	-0.00011 (-2.29)**	-0.0001 (-2.40)**	-0.0002 (-2.77)***	-0.0001 (-1.63)
Incre_500k	-0.00023 (-2.85)***	-0.0002 (-2.72)***	-0.0003 (-3.18)***	-0.0002 (-2.83)***	0.00009 (0.58)	0.0001 (0.48)	-0.0001 (-0.7)	8.64E-05 (1.4)
Cmapop_81	n/a	n/a	2.35E-08 (2.45)**	n/a	n/a	n/a	2.25E-08 (2.33)**	n/a
Cmapop_91	1.64E-08 (2.18)**	1.62E-08 (2.20)**		2.87E-09 (0.93)	1.52E-08 (2.35)**	1.37E-08 (2.28)**	n/a	4.89E-09 (1.16)
Pop_surr	2.80E-07 (3.93)***	2.82E-07 (3.98)***	4.16E-07 (4.25)***	1.03E-07 (2.48)**	-9.46E-09 (-0.84)	-4.51E-09 (-0.4)	-1.93E-08 (-1.28)	4.89E-09 (1.47)
Own_ccspop_1981	n/a	n/a	1.08E-07 (-0.09)	n/a	n/a	n/a	-8.02E-08 (-0.79)	n/a
Own_ccspop_1991	5.44E-07 (0.51)	7.04E-07 (0.63)	n/a	4.92E-07 (0.66)	-8.02E-08 (-1.61)	-6.83E-08 (-1.61)	n/a	5.32E-03 (0.51)
Change_Pop_91_81	n/a	0.0565 (1.14)	n/a	n/a	n/a	-0.0812 (-1.92)*	n/a	n/a
Percapita_member	-0.00879 (-1.02)	-0.0077 (-0.88)	-0.0086 (-1.03)	-0.0041 (-0.77)	-0.01513 (-0.48)	-0.0189 (-0.61)	-0.0547 (-1.76)*	5.67E-04 (1.05)
Percapita_mem_surr	-0.03992 (-2.04)**	-0.0373 (-1.91)*	-0.063 (-2.78)***	-0.0086 (-0.52)	0.03688 (0.92)	0.0424 (-1.04)	0.015 (0.25)	0.0028 (0.09)
Employ_rate	0.25442 (5.70)***	0.2037 (3.49)***	0.1714 (2.79)***	0.1052 (3.26)***	0.3441 (3.93)***	0.4152 (6.72)***	0.0792 (0.56)	0.0405 (-1.12)
Share_agric_employ	-0.41137 (-7.32)***	-0.3735 (-5.34)***	-0.3286 (-5.00)***	-0.1482 (-3.37)***	-0.4468 (-2.21)**	-0.4235 (-2.46)**	-0.2373 (-1.6)	-0.0199 (-0.25)
Share_prim_employ	-0.52944 (-4.89)***	-0.5183 (-4.57)***	-0.6457 (-6.77)***	-0.2642 (-3.07)***	0.21609 (0.83)	0.1825 (0.75)	-0.2749 (-1.37)	0.0995 (0.76)
Share_man_employ	-0.26696 (-3.50)***	-0.2484 (-3.16)***	-0.2728 (-3.51)***	-0.0605 (-0.97)	0.09266 (0.4)	0.1104 (0.5)	-0.4924 (-2.08)**	0.0538 (0.54)
%_non_farm self-empl.	0.06685 (0.73)	0.0647 (0.71)	0.024 (0.25)	0.0394 (0.72)	0.5148 (2.11)**	0.468 (1.98)*	0.0837 (0.4)	-0.0324 (-0.32)
Share_unidegree	0.09429 (-0.5)	0.0923 (0.49)	0.3324 (1.24)	0.0287 (0.26)	-0.07118 (-0.46)	-0.0631 (-0.43)	0.0878 (0.4)	0.2623 (3.12)***
Share_aborig	0.15736 (1.68)*	0.1447 (1.53)	0.226 (1.95)*	0.1116 (1.72)*	0.32286 (2.05)**	0.3663 (2.21)**	0.2133 (1.55)	-0.0189 (-0.26)
July_rh	-0.00003 (-0.09)	-0.0001 (-0.15)	0.0002 (0.54)	-0.0002 (-0.6)	0.00093 (1.98)*	0.0011 (2.23)**	0.0002 (0.33)	0.0012 (3.21)***
Jan_temp	0.00262 (2.61)**	0.0026 (2.53)**	0.0024 (2.28)**	0.0012 (1.86)*	-0.0021 (-1.97)*	-0.0018 (-1.66)	-0.0008 (-0.53)	-0.0014 (-1.5)
Percapita_cinema	334 (1.95)*	351 (2.12)**	391 (2.25)**	92 (0.83)	35 (0.9)	-36 (-0.97)	-4 (-0.12)	13 (0.89)
Percapita_outpatient	-10 (-0.63)	-1 (-0.79)	-6 (-0.32)	9 (0.48)	-134 (-0.76)	-143 (-0.82)	-120 (-0.67)	-44 (-0.61)
Observations	1995	1995	1999	1990	510	510	510	510
R-squared	0.3163	0.3178	0.2934	0.1841	0.4786	0.488	0.2085	0.3454

^{a-c} refer to Table 1; Constant term and provincial dummies included, not shown. ^dn/a denotes the variable does not apply.

Appendix Table 1: Description of Variables used and Data Sources

Dependent Variable	Description	Source
91-01_POP_CHANGE 96-01_POP_CHANGE	Percentage Change in the total population 1991 to 2001 Percentage Change in the total population 1996 to 2001	91 and 01 CoP Auth. ^a
Agglomeration		
DIST_CMA_100K INCRE_DIST_250K ^e INCRE_DIST_500K %Δ_81-91_POP NEAREST/OWN_CMAPOP OWN_CCSPOP_91 POP_SURR_91	Distance from centroid of nearest or own CCS ^b to CMA with a population of 100,000+ Incremental Distance from centroid of CMA with a population of 100,000+ to a CMA with a population of 250,000+. Computed from the difference between INCRE_DIST_250K and DIST_CMA_100K Incremental Distance from centroid of CMA with a population 250,000+ to CMA with population of 500,000+ Percentage Change in the total population 1981-1991 Population of the nearest/own Census Metropolitan area Own Census CSD non-institutional Pop. Sum of 1991 Population from surrounding CCSs	CRERL ^c , IDLS ^d 81 and 91 CoP, Author 81, 91 CoP, CRERL
Economic		
SHARE_ABORIG_POP SHARE_UNIDEGREE EMPLOY_RATE SHARE_AGRIC_EMPLOY SHARE_PRIM_EMPLOY SHARE_MAN_EMPLOY %NOMFARM_SELF_EMPLOY	Percentage of total non-institutional population reporting an Aboriginal Identity Percentage of population over 15 years of age, with a University Degree Individuals 15+ employed divided by total population 15+ All individuals 15 years and over employed in the Agriculture Sector divided by total population 15+ All individuals 15years and over employed in the Primary Sector divided by total population 15+ All individuals 15years and over employed in the Manufacturing Sector divided by pop 15+ Individuals 25-54 whose major job is self employment (non-farm) divided by total population between ages 25 and 54	81 and 91 CoP, Author
Amenities		
JULY_RH JAN_TEMP PERCAPITA_CINEMA PER_OUTPATIENT_CLINIC	20 year average July Relative Humidity data (%) 20 year average January mid temperatures (degrees Celsius) Density of cinemas in the CCS per 1,000 population Density of out patient clinics in the CCS per 1,000 population	Environ Can., CRERL DMTI, CRERL, 91 CoP, Author
Social Capital		
PERCAPITA_MEMBER PERCAPITA_MEM_SURR	Own CCS Co-operative membership divided by CCS pop. Co-operative membership from surrounding CCS divided by total population from surrounding CCS	Co-op Secr., CRERL, 91 CoP, Author

^aAuthor -denote data that was modified by the authors , CoP-Census of Population; ^bCCS stands for Census Consolidated Subdivision, which is our unit of observation, see footnote 8 for description ;^cCRERL-Canada Rural Economy Research Lab (www.crerl.usask.ca) examines all issues that affect the vitality of Rural Canada from a diversified economy, healthcare, environment, amenities, transportation, to a productive and sustainable agricultural sector. ILDS – Internet Data Library System provided data that was used in the conversion of spatial data; ^dThe variable INCRE_DIST was obtained by subtracting the distance to the nearest mega center from the distance to the nearest urban center; ^eData to proxy for social capital was generated from the 1992 Co-operatives Secretariat yearly co-operative mail survey.

Appendix Table 2: Consolidated Census Subdivisions (CCS) Descriptive Statistics^{a,b}

	Rural		Urban	
	Mean	Std. Dev	Mean	Std. Dev
Pop Change (91-01)				
CANADA	-0.009	0.170	0.108	0.149
BC	0.090	0.158	0.158	0.485
PRAIRIES	-0.067	0.163	0.105	0.140
ONTARIO	0.058	0.211	0.125	0.151
QUBEC	0.006	0.179	0.104	0.258
ATLANTIC	-0.062	0.152	0.043	0.124
Pop Change (96-01) CA	-0.024	0.108	0.032	0.073
Agglomeration				
DIST_CMA_100K	139,466	114,366	80,018	109,544
INCRE_DIST_250K	104,070	153,075	73,286	128,893
INCRE_DIST_500K	49,790	130,168	50,264	129,762
NEAREST/OWN_CMAPOP_91	581,372	886,499	936,410	1,222,055
POP_SURR_91	27,394	45,333	222,338	410,127
OWN_CCSPOP_91	2,770	3,770	41,723	112,297
Economic				
SHARE_ABORIG_91	0.044	0.110	0.035	0.054
SHARE_UNIDEGREE_91	0.046	0.036	0.108	0.076
EMPLOY_RATE_91	0.559	0.162	0.764	0.247
SHARE_AGRIC_EMP_91	0.103	0.118	0.032	0.046
SHARE_PRIM_EMP_91	0.019	0.034	0.014	0.030
SHARE_MAN_EMP_91	0.043	0.050	0.043	0.031
%NONFARM_EMP_91	0.073	0.051	0.083	0.029
Amenities				
JULY_RH	58.522	9.346	58.439	9.217
JAN_TEMP	-11.924	4.397	-11.584	4.283
PERCAPITA_CINEMA	1.69E-06	1.45E-05	1.45E-05	4.45E-05
PERCAPITA_OUTPATIENT	4.25E-05	2.06E-04	8.75E-06	5.75E-06
Social Capital				
<i>Co-op Member per capita</i>				
CANADA	0.109	0.294	0.063	0.172
BC	0.039	0.027	0.033	0.158
PRAIRIES	0.299	0.015	0.226	0.033
ONTARIO	0.012	0.046	0.010	0.127
QUEBEC	0.076	0.112	0.138	0.089
ATLANTIC	0.073	0.751	0.044	0.251
PERCAPITA_MEM_SURR	0.138	0.202	0.077	0.130
PERCAPITA_CONS_MEMBER	0.068	0.213	0.047	0.140
PERCAPITA_CONS_MEM_SURR	0.096	0.156	0.065	0.119
PERCAPITA_WORKER_MEMBER	0.002	0.019	0.000	0.001
PERCAPITA_WORKER_MEM_SURR	0.001	0.006	0.000	0.002
PERCAPITA_PROD_MEMBER	0.022	0.111	0.007	0.039
PERCAPITA_PROD_MEM_SURR	0.019	0.046	0.007	0.025
PERCAPITA_OTHER_MEMBER	5.41E-05	1.49E-03	1.63E-04	1.75E-03
PERCAPITA_OTHER_MEM_SURR	3.75E-04	0.005	0.004	0.043
N	2,086		515	