Places for place-based policies

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Documento de Trabajo N° 79
Programa Dinámicas Territoriales Rurales
Rimisp – Centro Latinoamericano para el Desarrollo Rural

DINÁMICAS TERRITORIALES RURALES

Cita / Citation:

Olfert, R.; Berdegué, J.; Escobal, J.; Jara, B.; y Modrego, F. 2011. “Places for Place-Based Policies”. Documento de Trabajo N° 79. Programa Dinámicas Territoriales Rurales. Rimisp, Santiago, Chile.

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Abstract

Place-based policy is both ubiquitous and widely criticized. The conventional economic case against place-targeted interventions is strong, relegating its application to a narrow range of cases where labor resources are immobile and/or in the presence of externalities. However, both globally and within nations, equity considerations lead to policies and programs for disadvantaged regions and/or the populations in those regions. In another dimension, the challenges of declining rural areas in North America or Europe may also be fundamentally different from the options to be considered in developing countries that are at a very different point along the development path. We propose a possible means of making choosing places for place-based policies, using the examples of Canada, Chile and Peru.

1. Introduction

The 2009 World Development Report, *Reshaping Economic Geography* (World Bank 2009), provides evidence that economic growth is uneven across and within countries, and argues that this inequality is beneficial. Both globally and nationally, production will become more spatially concentrated to realize agglomeration benefits. They argue that economic integration of the least and most favored geographic areas can be achieved through 'spatially blind' institutions and connective infrastructure. Place-specific or place-targeted intervention to address the least favored (in an agglomeration environment) regions is to be used more sparingly. Specifically the report declares that, *"…. policy debates on urbanization, area development…overemphasize geographic targeting—what to do in rural areas or in slums, what to do in lagging states or remote areas*..." (World Bank 2009, p. xxii).

The conventional economic justification for place-targeted policy is limited to a very narrow set of circumstances—systemic barriers to resource (labor) mobility and evidence of externalities. The productivity benefits of agglomeration economies provide a compelling case for the unimpeded mobility of resources from geographic areas of lower to higher productivity (and returns), the latter coincident with existing concentrations of economic activity (Glaeser and Gottlieb 2008; World Bank 2009). Policies directed at supporting economic activity in particular (low productivity) places, it is argued, not only reduces overall economic productivity by slowing needed adjustments, but may also be a disservice to the residents of disadvantaged regions. Critics claim that a culture of dependency may be created, prolonging the poor economic performance of lagging regions and slowing the movement of residents to places with better long-term prospects (Glaeser et al. 2001; Polèse and Shearmur 2006).

Nevertheless, public policy that targets particular locations with the intent of improving their performance is ubiquitous. In North America there has been an assortment of regional development policies and programs directed at lagging regions since at least the 1930s including agencies such as the Appalachian Regional Commission in the U.S. and the Atlantic Canada Opportunities Agency in Canada (Partridge et al. 2010). The EU Cohesion policy is a means of transferring "…*resources from affluent to poorer areas (in ordre to) modernize backward regions so that they can catch up with the rest of the Union*" (Europa 2010). In Chile decentralization policies since 1990 have given rise to a whole new institutional arrangement targeting regional development, directly involving three ministries and at least fifteen territorial development programs (Agostini et al. 2008; Cox 2008). Indeed in a representative democracy, spatial units are the building blocks for political power, representing a built-in incentive system for governments to cater to demands by geographic region. Internationally, the World Bank Millennium Development Goals include directing funding at the poorest countries (World Bank 2010). People-based policies directed at the development of human capital through improvements in the health and education of people in disadvantaged areas are core to

development policy and much less contentious that place-targeted policies (Acemoglu and Zilibotti 2001; Easterly 2001; Lucas 1988; Mather 1999; Schulz 1961; Hall 2000).[1] Examples of people-based policies are those designed to improve human capital through education and health programs. In Latin America and the Caribbean (LAC), for example, the conditional cash transfers programs make cash transfers conditional on school attendance and health-care checkups (Handa and Davis 2006). These programs have become widespread in LAC following the success of the *Bolsa Familia* and *Oportunidades* programs in Brazil and Mexico respectively with budgets of 2.1 and 2.4 billion $US respectively in 2004. However, many of the regional and international people-based policies are also place-targeted or place-based in that they involve site-specific investments of the kind that the 2009 World Bank report cautions against.

Facing policy-makers there is on the one hand, the attraction of promoting economic development through taking advantage of the benefits of agglomeration economies, and reducing geographically targeted intervention à la the 2009 World Bank Report. This approach will focus on people-based policies, relying on spatial equilibrium processes. On the other hand, the realities of spatially concentrated poverty and lagging regions will result in place-based and place-targeted interventions for a range or social, political, social and economic reasons. The practical policy question of identifying when and where site-specific or place-targeted interventions may be warranted is made more acute by the fact that demands for resources far exceed budget constraints and accountability in the use of public funds. Yet a systematic means of identifying those lagging communities or regions where local investment is most likely to be successful, is largely absent. This paper fills this gap in proposing a process, utilizing a series of 'filters,' for identifying communities that are the most likely candidates for geographically targeted interventions in order to facilitate an improvement in their economic outcomes. We use the examples of Canada, Chile and Peru to illustrate the resulting community classifications. Our evidence suggests that the proposed process holds promise in selecting communities that are both lagging and yet have a demonstrated capacity to benefit from place-specific investments.

This paper is organized as follows. The next section defines 'place-based policy' as it will be used in this paper. This is followed by a selected literature review including the conceptual framework. Section 4 presents the proposed community classification process for identifying candidates for place-based policy. Section 5 describes the data and illustrates the proposed community classification process using the countries of Canada, Chile and Peru, followed by a discussion of the characteristics of communities identified as candidates, along with observations regarding examples of successful place-based policy in Chile. Our conclusions are presented in section 7.

[1] Especially in a development context, institutions have been shown to be critical in order for human and physical capital investments translate into successful economic development (Acemoglu and Robinson 2008; Hall et al. 2010; North 2003; Pritchett 2001).

2. Defining Place-based Policy

Definitions and uses of the term 'place-based policy' vary in the literature and it is not our intent to provide a universal or exclusive definition. However, it is necessary to define how we use the term for our purposes. Generically place-based policy is policy directed at particular places, usually involving site-specific investments. Conceptually place-based policy could be directed at either regions with existing strengths, to enhance their competitiveness for example, or at regions that are lagging or otherwise represent 'problems.' Industrial policy may identify regions that show particular promise and promote that potential through place-specific investments. Another example is the 'growth poles' approach, usually consisting of identified strong urban centers that could 'pull along' the entire region through generating employment and input-output linkage benefiting the surrounding regions (Parr 1999; Richardson 2007). Large site-specific investments in transportation infrastructure or water development, though clearly site-specific, are typically undertaken for specific product-transport or sector development purposes rather than for the purpose of benefiting the regions where the investment is undertaken, though there may also be elements of the latter. Where the primary objective of the investment is not the enhancement of place-specific economic development, the policy cannot be considered 'place-based'.

Our definition of place-based policy requires first, that the objective of the policy is to benefit regions that are lagging relative to a national reference point. We thus take the policy perspective of a national or senior government. Within this set of regions, place-based policies may be designed to address a range of political, social and/or economic improvements. Our area of investigation is restricted to those cases where the place-based policy has economic objectives, that is, where the primary purpose is to improve economic outcomes in the region, rather than, for example, addressing national security. Consistent with the 2009 World Bank report, these are places that "… are economically distant from places that are doing well" (World Bank 2009, p. xxiii).

Second, we define place-based policy as the type of intervention that is place-specific and immobile, that is where the assets or the capacity that are the objects of the expenditure or investment, cannot leave the region. Physical infrastructure, local organizational innovations, governance reform and support for businesses in particular places would be examples. The site-specificity of the investment (or other intervention) is an important attribute, to rule out policies that may be subject to 'brain drain,' as is possible in human capital investment (Artz 2003; Beckstead et al. 2008). A policy that results in the best-educated leaving the region may well make the departing individuals, the receiving region and the nation better off, but it will leave the region of origin worse off.

Of course, any physical investment as a result of policy initiatives will be site-specific. For example, human capital investments may result in the construction of schools or training

facilities, and those investments will occur in particular places. However, we would classify these as 'place-based' only if their location were chosen for the purpose of improving the economic outcome of that region, rather than the economic outcomes for the people partaking of the education or training. On the other hand if it is government policy to assist lagging regions through the construction of training facilities for the purpose of preparing individuals for the particular skills demanded in that region, that would be a place-based policy.

In sum, we use the term 'place-based policy' to refer to spatially immobile public expenditures or investments in particular places or regions that are lagging relative to the national reference point, for the purpose of improving their economic outcomes.

3. Selected Literature and Conceptual Framework

3.1. Selected Literature

Differences in natural advantages and factor endowments result in the uneven distribution of economic activity, in neoclassical economics. More recently the importance of institutions in facilitating economic development, especially in the context of developing countries, has been demonstrated (Acemoglu and Robinson 2008; Hall et al. 2010; North 2003; Pritchett 2001). Over time technological or institutional change may alter regional advantages and thus the spatial distribution of economic activity.

Increasing concentration of economic activity, often in areas without natural advantages received new attention and focus with the advent of the New Economic Geography (NEG), largely attributed to Krugman (1991). The NEG and its refinements described in new detail both the role of the hinterland in spawning an urban hierarchy of core-periphery regions and the subsequent possible divergence of core and periphery due to imperfect competition, falling transportation costs, increasing returns to scale, and perfect mobility of key factors (Krugman1991; Fujita and Krugman 2004; Tabuchi et al. 2005). Independently of natural advantages, regions faced with growing demand (market potential) for their increasing-returns-to-scale industry products enjoy a competitive advantage, inducing factor inflows (Head and Mayer, 2004, p. 2616).

Agglomeration economies that support increased concentration of economic activity arise from location optimizing decisions by firms and households. Localization economies refer to benefits accruing to firms through easy access to input-output linkages, a skilled labor pool and knowledge spillovers (Krugman 1991; Martin and Sunley 1998). Urbanization economies (Jacobs, 1969) including human capital externalities (Glaeser et al. 2001) arise from urban size and the advantages that it affords beyond explicit input-output linkages or employment access. McCann (2007) proposes that the increasing importance and frequency of face-to-face interactions is especially important in the knowledge economy. Capitalizing on the productivity benefits of agglomeration economies, and the implied economic growth, underlies the 2009 World Bank report recommendations.

The consequences of strong agglomeration effects for rural areas have been investigated by examining the evolving rural-urban relationship (Polèse and Shearmur 2004; Khan et al. 2001).'Spread' and 'backwash' have been used to describe the effects of urban growth on the periphery or hinterland (Barkley et al. 1996; Partridge et al. 2007b). Similar concepts of complementary vs. competitive growth in adjacent areas are discussed by Khan et al. (2001) and Renkow and Hoover (2000). Rural-urban population and employment interdependencies exist through commuting, market access, population migration, access to urban amenities and firms and households fleeing urban congestion and high costs. Generally, (positive) spread effects occur when rural population/employment growth results from urban growth. Alternatively, rural population

and employment may decline as a result of increased economic activity in urban centers—a "backwash" effect. Empirical estimations have found that rural areas closer to urban areas are likely to enjoy spread effects, while backwash more likely prevails beyond the maximum commuting distance (Barkley et al 1996; Henry et al. 1997; Partridge et al. 2007b). In a development context, rural areas may have more difficulty in connecting to urban economies due to under-developed transportation and communication infrastructure.

Aside from 'connectedness' to urban centres, amenities and quality of life may be the source of growth in rural areas. Deller et al. (2001) show that natural amenities, such as access to recreation opportunities can significantly influence migration. Investigations of the effects of weather on the location choice of U.S. residents have concluded that local population growth is highly correlated with warmer winters and temperate summers, along with urban amenities and the initial stock of human capital (Glaeser et al. 2001; Rappaport 2007). Ferguson et al. (2007) find less amenity influence for population movements in Canada, though some sensitivity is indicated by age cohort. In developing countries movement to amenities is likely to play a smaller role as amenities are likely to have a high income elasticity of demand. Lall et al. (2006) look at rural-urban migration in developing countries and show that the decision to migrate involves 'push' and 'pull' factors. That is, potential migrants compare the local economies (wages and probability of finding employment), the existence of local amenities, the cost and availability of public goods and services or even institutional factors.

Rural communities that have neither the growth option of positive spillovers from urban growth nor the possibility of natural amenities attracting a growing population, face a narrower set of alternatives (Partridge et al. 2008; Pezzini 2001). These are typically rural areas with economic bases in fisheries, forestry, mining, agriculture, or routine manufacturing. Some types of primary production are more amenable than others to the development of manufacturing linkages (food processing related to orchard fruits, for example compared with grains). There are also considerable differences in the labor intensity of vineyards, fruits and berries, flower cultivation versus land extensive grain production. Areas where few input-output linkages have developed in rural areas and where productivity improvements have been labor saving rural communities are typically in decline. Long term population decline, in turn, leads to struggles with access to basic services such as health and education facilities and limits their potential for future economic activity (Johnson 1997; Stabler and Olfert 2002).

In the context of developing countries, the incidence of poverty rather than population losses may be the central consideration for resource-dependent rural communities (Agostini and Brown 2007). An agriculture-based subsistence economy may generate high rates of poverty in the absence of technology adoption or basic infrastructure development. Further, primary sector dependence may be a reflection of barriers or lags in the development of secondary and tertiary sectors. Nevertheless a body of empirical evidence suggests a pro-poor role of agriculture growth (Anríquez and López 2007; de

Janvry and Sadoulet 2002; Montalvo and Ravallion 2010; Vogel 1994). Examples include Chile and China, both countries having achieved remarkable poverty reduction since 1990. These studies do, however, acknowledge the "….the enormous bias of technological change against unskilled workers" (Anríquez and López 2004, p. 22), indicating that the increases in productivity may limit the positive effect of agriculture. The link between rural infrastructure investment, technology adoption and poverty has been extensively discussed (Jalan and Ravallion 2002; Lipton and Ravallion 1995; World Bank 1994).

Place-based policies and their justification are closely related to the 'infant industry' argument from the international trade literature (Rodríguez-Clare 2007; Sauré 2007; Shafaeddin 2000). A region's current lagging condition, or absence of key industries, may be overcome by assistance to industry development through public policies. An example of industry development with public subsidy is the salmon industry in Chiloe in Chile. Although Chile started its production with full force only after the 1980s, by 1992 it was the world's second largest producer of salmon, behind Norway (Bjørndal 2002). In 2008, the salmon sales value was $2.5billioin ($US). Between 1990 and 2002, direct contributions from the state in the sector are estimated at about $80million ($U.S.) (Liberona 2010). Bjørndal (2002) concludes that the major contributing factors to the success of the salmon industry in Chile have been the naturally favorable environmental conditions, the availability of risk capital, low labor cost, local provision of fishmeal and a policy of minimum intervention by the Chilean government. The industry has boosted economic activity in formerly depressed regions and become a major generator of foreign currency (Bjørndal 2002).

The infant industry argument is that beyond the initial assistance, the industry and the region can become self-sufficient and viable. The classic problem, of course, is that if the 'infant' is subsidized the incentive to mature (grow-up) is largely removed. Chang (2003) describes the use of tariff protection and subsidies by now-developed countries in the early stages of their development, suggesting that in trade negotiations, currently developing countries may be given more leeway to practice the same as they 'catch up.' A careful cost-benefit analysis *a priori*, and subsequent monitoring including sunset clauses for the termination of the subsidies, and judicial selection of industries is required (Ranis 2003; Reinert 2000).

Discerning the conditions under which place-based policy may be warranted is a significant challenge (Drabenstott and Henderson 2006; Johnson 2007). Rural place-based policies have been justified as a response to spatial frictions that limit labor mobility to better job opportunities, or externalities (Kilkenny and Kraybill 2003; Olfert and Partridge 2010; Partridge and Rickman 2008). Spatial frictions include information costs about labor market opportunities, distance costs that limit migration and commuting, and frictions in the housing market that limit worker relocation closer to employment opportunities. Supporting place-based intervention, there is evidence that regional labor markets adjust with a substantial lag (Bartik 1993; Partridge and Rickman

2008). Where there is evidence of spatial immobility poor residents may be better supported where they live as new employment in poor regions will flow significantly to existing residents. Likewise, Partridge and Rickman (2008) find additional evidence that in more remote areas, an even greater share of original residents takes the newly created jobs, while Renkow and Hoover (2000) shows the same for urban adjacent locations. Thus, there is evidence that place-based policies can be effective when optimally applied. The usual qualifications of cost-benefit analyses apply.

Policy intervention is costly and its application must thus be selective. Ideally a full opportunity cost assessment of the use of public funds would be made. However, at a minimum a reasonable expectation of a return on public investment is an important consideration. Further, the high degree of heterogeneity among rural communities suggests that place-based policy needs to be tailored to suit local circumstances, in both eligibility assessment and evaluation.

3.2. Conceptual Model

Community-level population growth and poverty outcomes are the basis of the community classification process we propose. The framework for our empirical investigation is the spatial general equilibrium framework of Roback (1982). Location choices of households and firms are responses to spatial differences in (expected) utility and profits. Local economic growth occurs in response to shifts in exogenous factors, or changes in the valuation of these factors (Beeson and Eberts 1989; Chen and Rosenthal 2008). The potential influences include economic, geographic, demographic, institutional, social and amenity factors, with wages and rents adjusting to reflect shifts in utility and costs. Net migration is the means by which utility and profits are equalized across space.

Firms choose their locations to maximize profits and assuming that output prices are exogenous, this is equivalent to minimizing costs. Costs of production in region *i* will reflect local land and labor costs, public infrastructure and services, natural resources, labor force quality and distances to input suppliers and markets (Head and Mayer 2004; Partridge and Rickman 2008). The size of the local region may also exert an influence through productivity-enhancing information spillovers, especially for knowledge intensive firms (Chen and Rosenthal 2008). Beyond local availability, distances to nearby urban centers and their sizes, will affect access to the full range of input and output markets, especially higher-order producer services and a pool of skilled labour.

The representative household *h* choosing among potential locations is assumed to derive utility from the consumption of traded goods, housing, and site-specific amenities. Labour income (wages), along with the probability of being employed will constrain consumption. Amenities include natural and built/ urban amenities, the latter being sensitive to urban size and density. Both employment probability and access to urban amenities are affected by the distance to the urban structure.

Long-run equilibrium requires equalization of household utility and production costs across regions, net of moving costs. In the approach towards equilibrium, net migration into region *i* is related to the size of the expected utility improvement for the representative household, while firms respond to cost differentials (Rappaport 2007). Firms' decisions influence household decisions through wages and rents. In reduced form, population change in region *i* between periods *t* and *t+1* is thus expressed as:

$$\%\Delta POP_{i,(t+1)-t} = f(Z_{it}), \quad (1)$$

where Z_{it} is the set of the region's initial-period characteristics. The empirical specification includes a residual terms and assumes that $f(.)$ is a linear function βZ_{it}.

This framework relies on net migration to equalize utility across space. Where there are barriers to mobility these may translate into pockets of poverty. The incidence of low income or poverty is then hypothesized to be a function of local population and community characteristics identified above. Blank (2004) and Levernier et al. (2000) emphasize the importance of the natural environment, socioeconomic structure, public and community institutions, and the demographic characteristics of local population in shaping poverty levels across communities. Our assessment of poverty thus includes the same factors that trigger net migration, plus past poverty levels and concentrations of vulnerable populations.

4. Proposed Community Classification process

The existence of place-based policy within nations generally arises from considerations of promoting and improving the long-term viability of targeted regions, as well as equity concerns. As described above, urban concentrations enjoy the productivity benefits implied by agglomeration economies. To the extent that rural areas are, by definition, less likely to benefit from urban-based agglomeration economies, we focus on rural areas. Empirical evidence suggests that rural areas generally have a higher incidence of poverty, partly because the labor market tends to be thin with employment opportunities concentrated in minimum wage occupations and part time offerings with limited job security (Gibbs 2005; McKernan et al. 2001).

Rural areas, however, exhibit a great deal of heterogeneity. Many rural communities are well-integrated into nearby urban centres through commuting and input-output linkages (de Ferranti et al. 2005; Ferguson et al. 2007; Partridge et al. 2007a). Others may be tourist and retirement destinations, based on their natural amenity attractiveness. However, some rural communities remain dependent on the employment generated by their natural resources bases, as this is their comparative advantage. Remoteness from markets and potential commuting destinations (aggravated by the lack of public transportation), or relative immobility of their populations, limits their participation in agglomeration economies (Brown and Stommes 2004; Davis et al. 2003). We thus further limit consideration to rural areas that are dependence on natural resources.[2]

In our universe of communities that are rural and resource-dependent (RD) our first 'filter' in the selection of communities that may be candidates for place-based policy will be those that exhibit above average poverty, a reflection of **Need**.[3] Above average poverty rates in this set of communities provides evidence that the community is lagging, even within the set of all rural RD communities that have limited potential to benefit from agglomeration-led growth.

However, successful place-based policy also requires the potential for success. For public accountability and considering limited budgets, communities or regions receiving interventions must have the capacity to benefit from the policy. Thus, the second 'filter' we propose is the presence of **Capacity**. It is not clear how current performance and Capacity may be related. It may be that the communities that have the worst relative

[2] A further reason for selecting resource dependent communities is the 'natural resources curse' as described by Sachs and Warner (1995), which suggests that countries and regions with a natural resources dependency demonstrate slower growth. Yet, natural resource dependence *per se* is not the immediate cause of poor economic outcomes for resource dependent communities (Peluso et al. 1994).

[3] Below average population growth is another potential indicator of Need, though the case is more difficult to make for population growth as this may be the reflection of desirable adjustments, and the case would need to be made on the basis of externalities.

performance are also those with limited capacity to respond to policy interventions, though there is no *a priori* reason to assume that this is the case.

One means of inferring regional or community **Capacity** is a comparison of the community's actual performance relative to its potential or expected performance (given its characteristics), as represented by the residuals of econometric models. That is, residuals can provide guidance as to whether the region's actual performance falls short of its capacity, given its characteristics and estimated coefficients based on 'average' relationships. For region *i* positive residuals (actual-predicted) in a poverty model and/or negative residuals in a population model signify 'under-performance.' That is, regional characteristics suggest better outcomes than what are being observed. The reasons for the differences will lie outside the model and may include omitted, unobserved or unmeasurable variables. Under-performance suggests that targeted intervention may move the region towards its capacity.

The relative importance of under-performance in population vs. under-performance in poverty (where a community's performance differs in these two dimensions), in terms of receiving policy attention is not clear. The type of under-performance may imply different types of intervention. Under-performance in poverty combined with over-performance in population growth may signify a distribution problem within the region as economic growth is not being shared in a way to reduce poverty. On the other hand there may simply be a lag between economic growth and poverty reduction.

To sum up, we propose applying quantitative evaluation and empirical estimation to the question of whether particular communities are candidates for place-based intervention. Beginning with rural RD communities we will focus on those with above-average poverty levels to indicate **Need**. We then rely on empirical estimation to identify communities that have the **Capacity** to perform better than what is being observed, by providing information on their actual performance relative to what would be expected. Rather than being exclusive, this process seeks to identify those communities that are the ***most likely*** candidates for place-based policy. From a broader societal perspective there may be other important and well determined policy objectives that require place-based policies.

5. Empirical Design

Our study area encompasses three countries—Canada, Chile and Peru. Each has large rural areas dependent on natural resources. Canada's predominant rural development problem is rural population loss due to the labor-shedding nature of primary production. In Chile and Peru, the more pressing rural problem is poverty.[4] We describe below that application of the 'filters' suggested above.

5.1. Data

For Canada, the data for this study are primarily from Statistics Canada's 1991, 2001 and 2006 Censuses.[5] The geographic unit of analysis is the consolidated census subdivision (CCS), which consist of individual towns plus their immediately surrounding rural areas.[6] Rural CCSs are defined to include all CCSs other than those that are part of Census Agglomerations (CAs) or Census Metropolitan Areas (CMAs).[7] For Chile, we rely mainly on the 1992 and 2002 national population and housing Censuses, with community being represented by municipality-level data (communas) (MIDEPLAN 2005).[8] In defining rural communas for Chile we follow Berdegué et al. (2010); rural is defined through an urban-communities exclusion process, driven by a set of thresholds for an array of features indicating urban characteristics. Municipalities surpassing any of the thresholds, the minimum values observed for metropolitan comunas, are considered urban while the remainder are rural. For Peru, the population data is from Peruvian Population 1993 and 2005 censuses, and our geographic unit of observation is the Province. In the Peruvian Census definition, a rural inhabitant is a person living in a place with 400 dwellings or less. For this study rural provinces are defined as those having rurality rates above the national average of 32%; 159 of 195 provinces in Peru are rural; 71% of the population in these provinces is rural using Peruvian Census definition.

The period 1991-2001 (1992-2002/1993-2005) is used for the population change models in Canada (Chile/Peru). The 10-year time period is considered long enough to represent long-run population movements and to avoid contamination by short-term idiosyncratic

[4] However, poverty is also an issue in Canada as is evident from the recent Senate Report on Rural Poverty (2007) and population losses in rural communities is also a concern in Peru and Chile (Anríquez 2003).
[5] Data sources and selected descriptive statistics are presented in Appendix Table 1.
[6] The foundation of Canadian statistical units is the census subdivision (CSD), which is usually an incorporated urban or rural town or municipality (du Plessis et al. 2002). CSDs often do not form a functional economic unit. For example on the Prairies, a town or village forms a CSD, while the surrounding rural municipality forms another CSD. Statistics Canada merges the two into a (more functional) census consolidated subdivision (CCS).
[7] CMAs and CAs are formed by one or more adjacent CCSs centered on a large urban core. The population of the urban core must be at least 10,000 to form a CA and at least 100,000 to form a CMA. To be included in the CMA or CA, adjacent municipalities must have a high degree of integration with the central urban area, as measured by commuting flows (Statistics Canada 2004). Communities are classified as rural if they do not geographically overlap part of a CA or CMA. Any community not tightly linked to a city of 10,000+ people is classified as rural.
[8] Both the northern and southern extremities of Chile are excluded, with the sample restricted to the area between Regions of Coquimbo and Los Lagos, containing nearly 86% of municipalities and 91% of national population.

changes. It also helps ensure that the (1991/2/3) explanatory variables are predetermined, avoiding direct endogeneity bias in the estimated coefficients.

The Canadian poverty models use 2005 poverty levels defined as percentage of households with a 2005 income of less than $20,000.[9] In Chile, we define poverty in terms of population with incomes below official poverty lines.[10] Poverty figures were taken from Modrego et al. (2010) in an application of the small area estimation method by Elbers et al. (2003). Poverty levels for Peru were estimated by Escobal and Ponce (2008) combining Census and Household surveys to provide poverty estimates at the provincial level.[11]

Resource dependence (RD) is defined on the basis of the primary sectors' Location Quotients (LQ), calculated as the community percentage employed in the combination of agriculture, mining, forestry, and fishing relative to the same employment percentage for all rural communities.[12] A LQ of greater than one defines the community as resource-dependent (RD). In Canada this resulted in 1,093 of 2,093 rural communities being defined as RD; in Chile 153 of 221 communas and; in Peru 99 of the 159 rural provinces. In all three countries distance is measured in kilometres as the distances between the geographic centroids of the rural communities and the nearest urban centre of interest.

5.2 Implementation

Population Change Model

Population change over 1991-2001 (1992-2002/1993-2005) for each rural community *i* in province or region *p* is expressed as a function of (beginning of the period) natural resource dependence (RES), locational/geographic (GEO), economic (ECON), and demographic (DEM) characteristics. In addition a number of variables reflecting social inclusion or social capital (SOC) are included. σ_p denotes the provincial/regional fixed effects, and ε is the error term. With regional or province fixed effects (for example, tax,

[9] The most commonly used poverty measure in Canada is the Low-Income Cut-Off (LICO). However, Statistics Canada does not estimate LICO for Indian Reserves. As the latter are of special interest to this study, we have selected a 2005 income of $20,000 as a cut off to classify economic families (including all reserves) as being low-income or 'poor'. The rationale for using this cut-off for family income level is as follows: first, it is highly correlated with the community's percentage of families below LICO levels across Canada (.70); second, an examination of expenditure patterns gives some credence to this absolute level. The typical Canadian household spent $38,613 on necessities (food, shelter, household operation, household furnishings and equipment, clothing, transportation, health care, and personal care) in 2005. The $20,000 cut-off would represent potential expenditures by an economic family of less than half of what the typical family spends on 'necessities.'

[10] In 1992 the absolute poverty levels in Chile were approximately US$888 per capita per year in urban and US$ 600 in rural areas; in 2002 near US$ 864 per capita in urban and US$576 in rural areas.

[11] Peruvian poverty models use 2005 poverty levels defined as percentage of households with an annual per capita expenditure of less than US$ 1,020, spatially adjusted to account for regional prices differences across Peru.

[12] Using the reference point of all rural communities is appropriate as we are focussing on identifying a subset of rural communities for which we will assess population change and poverty rate determinants.

expenditure, and welfare policies) included, the regression coefficients reflect within-province variation in the explanatory variables.

$$\%\Delta POP_{ip1991\text{-}2001}=\alpha+\beta_1 RES_{ip}+\beta_2 GEO_{ip}+\beta_3 ECON_{ip}+\beta_4 DEM_{ip}+\beta_5 SOC_{ip}+\sigma_p+\varepsilon_{ip} \quad (2)$$

RES vector includes the LQ Prim as defined above, calculated at 1991/2/3, as well as a manufacturing location quotient (LQ Mfg). The prominence of the primary sector is generally expected to exert a negative influence on local population growth as these sectors have long been labor-shedding. Further, analogous to the country-level findings, natural resource development may 'crowd out' other economic activity and lead to specialization and greater vulnerability. The size of the manufacturing sector may offer a preferred alternative (to primary production) for rural communities. However, manufacturing has also been subject to successively labor-saving technological change as well as trends to move routine manufacturing off-shore. For these reasons the expected sign of LQ Mfg is ambiguous.

The GEO vector includes distance measures, a community size/area measure and natural amenity variables. For Canada the distance variables are structured to represent the urban hierarchy, that is, urban centres of 10,000-99,999, 100,000-499,999 and >500,000 population. First, distance to the nearest urban centre (of any size) gauges the remoteness of the rural community from urban services, amenities, markets and potential input-output linkages. The other two distance variables are the incremental distances (beyond nearest) to successively larger centres.[13] In each case we would expect the remoteness and population growth to be a negatively related as sources of economic opportunities are more limited (Henry et al. 1997; Partridge et al. 2008). In Chile the urban hierarchy is represented by the following population sizes: 20,000-99,999; >100,000; and Santiago (near 6 million). In Peru the urban hierarchy is represented by urban centres of at least 50,000, incremental distance to an urban center of at least 75,000 and incremental distance to urban centres of at least 100,000 of population.

The area of the community is included as an indicator of the availability of land for new economic activity or the physical size of the natural resource base; a positive relationship is expected. Three natural amenity variables for Canada are average January temperatures, average annual precipitation and mean elevation. It is expected that higher January temperatures are preferred, as well as greater elevation for the possibility of more attractive landscapes. The impact of precipitation levels is less clear as more rain and snow generally represent less desirable conditions, though better growing conditions with more attractive vegetation and the possibility of snow sport have offsetting

[13] If the nearest centre is 500,000+ then both incremental distance measures will be zero. No additional time or monetary costs need be incurred to access higher order services in higher tiered centers. However, if the nearest urban centre is, for example, 350,000 in size, then there will be an additional distance penalty related to remoteness from the top of the urban hierarchy, namely to reach a place of 500,000+. Further, if the nearest urban centre has a population of 20,000, for example, then the rural community would incur a distance penalty both for its remoteness from the nearest centre of 100,000-499,999 size as well as a 'cost' for remoteness from the top of the hierarchy.

influences. In Chile, the amenities set included monthly average temperature of the coldest month (July), annual precipitation, mean elevation and distances to ocean and nearest lake. Following some specification tests, only the latter was included For Peru the amenities set initially included average monthly temperature, annual precipitation and mean elevation with only the latter included in final specifications

Economic conditions (ECON), beyond the industry distribution already captured by location quotients, are represented by several variables describing initial economic conditions in the community and labor market tightness, designed to capture employment opportunities both within the community and within commuting distance. The first two are the unemployment and labor-force participation rate. Labor demand shifts are accounted for by local job growth over the 1991-1996 period (*lagged* to reduce the possibility of direct endogeneity), which is expected to have a positive influence on local population growth. To account for the broader potential commuting-zone labor market effects, job access (a distance-weighted average job growth of nearby CCSs) is included.[14] For Chile, local job growth is not available; we include initial unemployment. For Peru initial year labor force participation and unemployment were highly colinear with education and thus dropped from the final specifications.

The percentage of the local labor force that commutes to employment in urban centres (Canada) is expected to be positively related to population growth, as the rural community serves as a place of residence from which to access urban employment.[15] We include both in- and out-commuting rates, with the latter having an ambiguous influence. Local population size represents the possibility for agglomeration economies.

The vector of demographic characteristics (DEM) includes a measure of local entrepreneurship, the poverty rate, human capital and Aboriginal population share. In Chile we included the Gini coefficient of average per capital income as a measure of economic inequality, which is expected to exert a negative effect on population growth. Local entrepreneurship (proxied by self-employment) is expected to contribute positively to community opportunities; higher past poverty has expected negative effects. Average years of education, representing human capital, are expected to be positively related to population growth. The percentage of Aboriginal population is expected to have a positive influence through higher rates of natural increase, and immobility due to Aboriginal identity and heritage.

[14] CCS's job access measures ($\Sigma\ Jobs(j)/\ Dij^2$) is the sum of total of jobs in all neighboring CCSs weighted by respective distance from a given CCS where, *Dij* is the distance between CCS*i* to all its neighbors and *Jobs(j)* denotes the local number of jobs in each neighboring CCS . The inverse of the squared distances of neighboring CCSs is used as a weight to penalize distant neighbors due to higher friction at greater distances.

[15] The literature identifies two possible explanations for rural out-commuting—deconcentration and rural restructuring (Renkow and Hoover 2000; Partridge et al. 2010). The former refers to out-commuting being the consequence of rural population growth as urban (and rural) populations choose a rural residence while accessing nearby urban employment. Rural restructuring posits higher out-commuting rates reflecting the loss of local employment opportunities.

Three variables are included to capture social cohesion and social capital. The first is an ethnic diversity index ranging from zero to one with zero indicating a single birthplace region/country and one indicating that the place of birth of the population being equally distributed over seven world regions of origin (Florida 2002; Florida et al. 2008; Olfert and Partridge forthcoming). Greater diversity is posited to contribute to potential in-migrants, partly through immigration. The percentage of the population that owns their dwelling reflects mobility costs that reduce migration. The third social cohesion variable is the percentage of the population that lived in the same community five years ago.[16] In the case of Chile, this variable was replaced by the percentage born in the same community.

5.3. Poverty Model

Analogous to the population change model, the poverty model uses a place-based empirical specification used by Chokie and Partridge (2008) and Levernier et al. (2000). The dependent variable is the 2005/2002 poverty level measured as described above. Right hand side variables are those from the population change models plus a number that are considered to have special relevance for the poverty context. The poverty regression model is as follows for rural community *i* in province *p*,

$$POV_{ip,2005}=\theta+\gamma_1 POV_{ip,1991}+\gamma_2 WPOV_{ip,1991}+\gamma_3 RES_{ip}+\gamma_4 GEO_{ip}+\gamma_5 ECON_{ip}+\gamma_5 DEM_{ip}+\gamma_5 SOC_{ip}+\sigma_p+\varepsilon_{ip} \quad (3)$$

POV_{1991} is the representation of lag of the poverty rate to capture mean reversion and any other lagged adjustment effects based on historic poverty levels (Partridge and Rickman 2008)[17]. To account for clustering/spillovers effects, average 1991 poverty rate in surrounding communities (WPOV*)* is measured as the distance weighted average poverty rate in surrounding communities.[18] The DEM vector, in addition to those variables described above, now also includes the percentage of immigrants (within 5 years) in the local population, the percentage of lone female headed households, percentage of population over 70 (66 for Peru) and under 10 (13 for Peru) (Chokie and Partridge 2008).[19]

[16] Census subdivision (CSD) rather than CCS is used to represent community because the data report only residence 5 years ago in terms of CSD, not CCS.

[17] The ideal variable would be the percent of economic families with income below $20,000 (adjusted for cost of living). However, these data were not available for 1996 constant CCS boundaries prior to 2006. Given the high correlation between LICO and % with income below $20,000 reported above we use the LICO.

[18] The weight matrix W in WLICO is a row standardized distance-smoothing decay weight matrix created using the inverse of the squared distances of neighboring CCSs. A bandwidth of 880kms is used as a cutoff distance.

[19] Immigrants in Canada of more than five years ago are not included as they have greater scope for integration.

6. Results

Selected descriptive statistics for all three countries are shown in Table 1 for both RD and non-RD communities. In all three countries, RD communities were more remote, had somewhat higher poverty levels, somewhat lower levels of education and more static populations. Population growth rates are much lower for RD communities in all countries; in Canada with negative growth rates.

6.1. Model Estimation

Econometric results from the population and poverty models, used for the determination of capacity, are presented in Tables 2a and 2b. Although the same *groups* of variables are used in each country the specific variables used to represent the group vary due to data availability and local conditions. The scale of the variables also varies across countries, an important consideration in interpreting the values of the coefficients.

As expected the LQ (Primary) has a significant negative effect on population change in all rural communities; it has an even greater negative effect in RD communities (Table 2a). Distance to agglomeration economies exerts a clear negative influence, both to the nearest urban centre as well as an incremental negative effect for distances from successively larger urban places. For Chile, only the distance to Santiago, at the top of the urban hierarchy, has a significant negative effect. In Canada significant positive influences are the labor force participation rate, local job growth, total population, out-commuting rates and Aboriginal share of the population. For Chile, average years of schooling has a positive influence while variables with significant negative influences include the Gini coefficient and the unemployment rate. For both Chile and Canada the share of the population of long time residents has a negative influence. Rather than capturing commitment to the community and social capital, this variable is more likely reflecting the absence of new in-migrants. In Peru, land area has a positive influence on population growth, while initial population size and mean elevation exert statistically significant negative influences, the latter likely representing remoteness rather than amenities for Peru.

The poverty results, presented in Table 2b, show that initial period poverty is a significant contributor to current poverty in Canada and Chile, though this is not borne out in Peru. In Canada, average years of schooling negatively influences poverty, as does job growth. In Chile surrounding community poverty, unemployment, and the Gini coefficient are contributors to poverty. In both Chile and Canada the share of Aboriginal population is positively associated with higher poverty, while in Peru there is a negative relationship. In Chile and Peru the share of young people is positively associated with poverty rates.

6.2. Classification

From the estimated models, predicted values of population change and poverty rates were generated for each community. The differences (actual-predicted) are the residuals that are used to assess each community's 'under-' or 'over-performance.' Scatter-plots showing the intersection of classification by below and above average poverty (population change) and the residuals, are show in Figures 1 and 2. Figure 1 measures population change along the horizontal axis, with the vertical axis positioned at the average for all rural RD communities. To the right of the vertical axis, then, are communities whose population is growing at a rate greater than the average, or with lower rates of decline. The residuals are measured on the vertical axis. Communities above the horizontal axis are those whose actual performance was better than predicted (positive residuals). For all three countries there is a clear pattern of underperformance being positively associated with lower population change.

It is important to highlight that this underperformance is a relative to the mean of each country. As residuals add up to zero, there will always be communities that 'underperform' and communities that 'over perform'. A different yardstick (e.g., other countries) would produce a different assessment.

Figure 2 shows the relationship between actual poverty and residuals of the poverty model. To maintain consistency in terms of favorable and unfavorable outcomes, and reflecting the fact that poverty is a 'negative' the axes have been changed. Poverty levels, measured along the horizontal axis, decrease from left to right. That is, with the vertical axis positioned at the mean poverty level, all communities to the right of the vertical axis have better poverty outcomes (lower poverty) than the average for all rural RD communities. Residuals are measured along the vertical axis with the value of the residuals decreasing from bottom to top. Thus all communities above the horizontal axis are performing better than predicted (they have negative residuals, actual poverty is less than predicted). Again there is mostly a positive relationship between performance in terms of residuals and actual poverty outcomes; the lower the poverty level, the more likely that the community is over-performing. The latter pattern is less pronounced in Chile than the other two countries.

In terms of selecting candidates for place-based policy, those that have both a more serious poverty problem than the average and capacity beyond their actual outcomes (underperforming) may be of prime interest. This set of communities appears in the lower left-hand quadrants of Figure 2. Comparing descriptive statistics for under-performers in poverty with over-performers suggests that under-performers have *lower* initial period poverty levels than over-performers in both Chile and Canada, and slightly higher in Peru. They were farther from urban centers especially in Peru and to a lesser extent in Chile, though not in Canada. The population size of the under-performing communities was smaller in Canada and Chile, though larger in Peru. The unemployment rate was *lower*, the job growth more negative in Canada, and the level of education is

somewhat lower. However the most dramatic difference in Canada is that % Aboriginal population, representing 20% among over-performers and 6% among under-performers.

The descriptive statistics comparison between under- and over-performers underlines the importance of further investigation of influences outside the factors included in the empirical models. Under-performance is relative to community characteristics. Communities with above average values of negative influences will have lower expected performance; their actual performance is thus evaluated relative to a lower standard. Similarly communities blessed with above average quantities of favorable factors will have higher expected performance against which their actual performance is measured. Thus this process of evaluation will not identify communities with poor outcomes due to their characteristics as represented in the empirical models. Rather this process will identify communities that are not fulfilling their potential, given their characteristics. The reasons are not found in the explanatory variables in the empirical estimation. The 'omitted' factors responsible may be immeasurable characteristics such as institutional, cultural or historical factors.

6.3. Case Study

A small case study in rural Chile in the fall of 2010, of 3 communities, may be suggestive of the practical applications of the methodology proposed here. Descriptive data were assembled and interviews conducted with municipal and regional offices, sectoral agencies, local entrepreneurs and a local NGO. The three communities, San Clemente, Colbún and Longaví are located in the Maule Region 250-300 kilometers south from Santiago, all had higher than average (for all rural RD communities) poverty in 1992 and 2002. Based on the poverty models estimated for all resource-dependent rural communities one of them (San Clemente) was 'under-performing' in poverty as of 2002 and the other two were 'over-performing.' That is, evaluated at 2002, San Clemente would have been assessed as being candidate for place-based policy, based on its above-average poverty and implied capacity beyond what was being realized. The other two communities serve as controls. In all three cases the 2006 poverty levels were below the average for RD communities, suggesting an improvement between 2002 and 2006.

Considering possible reasons for under-performance of San Clemente, both the town's characteristics that might lead to better expected outcomes than what are being realized, and the possible reasons for failure to capitalize on these assets, must be considered. San Clemente's assets include its close proximity (23kms) to Talca (population 193,755). Further, with a population of 37,260, it is more than twice the size of the average rural RD community (14,543), giving it some advantages in terms of its own size. Interviews also suggested that an asset of the community is its diverse agriculture with a developing fruiticulture and specialty seed production. Given San Clemente's favorable characteristics, expectations regarding its performance would be high. Under-performance is likely due to failure to utilize or build on its assets. Failure to capitalize on its close proximity to Talca, and/or the possibilities indicated by its own population size

would result in under-performance. Among the barriers to developing its assets identified in the interviews were the independent and short term operations of individual ministries and sectors, obviating integrated and long term planning.

In terms of policies that may address San Clemente's under-performance, a number of initiatives are suggested by the data and the interviews in the town. San Clemente has a clear asset in its proximity to Talca. Positioning itself as an attractive dormitory community with excellent transportation access to Talca would enhance that advantage through policies that are directed at improving quality of life for its residents. Region-level coordination and cooperation is required, as well as technical improvements in production and better marketing of products including the specialty seed market. Further region-wide development of infrastructure, organizations and institutions related to enhancing existing assets and deepening competitive advantage in agriculture, tourism and access to urban areas may spur it towards its potential. Education and skills development should be coordinated across industries and local governments, augmenting the commuting possibilities to Talca and for the larger regional labor force. Specific avenues for improvement would require local input and participation to ensure local 'buy-in'.

7. Conclusions

While we acknowledge that political and social objectives may be as important, or even more so, our analysis has focused on two community level outcomes, poverty and population change. Our study areas include a developed country and two developing countries. The bid for place-based policy is more likely to be based on population decline in developed countries and more likely based on poverty in developing countries. Developed economies are likely to have a well-developed urban structure as well as transportation, information and communication technologies and services that facilitate rural-to-urban migration. While this is an expected outcome of agglomeration economies, this process leaves many rural communities, especially those dependent on their natural resources base, in decline. Developing countries are more likely to struggle with regionally concentrated poverty where economic growth is either limited or has not generated benefits for the broader population. It is, of course, also the case that there will be pockets of poverty in developed countries (Canada Senate 2008) and places where there are concerns about population decline in developing countries.

The economic case for place-based policy in the case of population decline (most likely in developed countries) is most likely to be based on an externalities argument. The flow of human resources to areas of higher productivity/return that is the essence of agglomeration economies, signals a relative absence of barriers to mobility. Thus the case for addressing the decline of rural communities may be made in terms of the loss of future options for rural development, cultural and environmental losses. Further, excess infrastructure capacity in rural areas and congestion and associated disamenities in urban areas may suggest externalities. In this context our 'under-performers,' those communities that are experiencing greater (smaller) actual population declines (growth) than the model would predict, may have local assets or capacity that could be leveraged to address existing or potential externalities.

Addressing place-based policy to poverty is more likely to find economic justification in local barriers to development and/or mobility. Our 'under-performers' fall short of realizing their potential as represented by their community characteristics, including their location relative to agglomeration economies. Among the impediments could be infrastructure, cultural, institutional barriers, or a lack of a coordinated and coherent approach to development. It is likely that barriers to mobility, especially those related to the information and monetary cost of moving are more significant in developing than in developed countries, as well as being more difficult to eradicate due to high costs. An externalities argument for directing place-based policies at poverty may be in the form of an 'infant-industries' argument.

The practical task of selecting communities for place-based policy by senior governments, we argue, may begin with equity consideration, that is, some measure demonstrating Need in the community. In this study we focus primarily on relatively high

poverty levels, though the same approach could be used for lagging population growth. For accountability reasons, and efficiency considerations, beyond the identification of Need, the communities/regions must have the potential to benefit from the interventions. We propose that capacity can be inferred from the residuals of econometric models of poverty (and population change). Further, an evaluation and monitoring function is appropriate at the senior government level, beyond the selection of communities. Proposals/projects must be fully and properly assessed for their viability, their costs and benefits.

Inasmuch as significant development success is likely to involve infrastructure and capacity development across multiple sectors, private and public, and often several communities, senior governments can facilitate coordination and cooperation among the relevant players. Sustained effort and commitment to a course of action may also be facilitated by senior government levels, as well as access to information and communication resources.

Beyond what are clearly senior government functions described above, however, local communities and regions are in the best position to make decisions regarding the particular projects, sectors of investment, timing of projects, etc. They have the best information about the local objective functions, the feasibility and desirability of particular initiatives and the degree of local 'buy-in'. Fundamentally, given the nature of the economic development process, the community/region's involvement and committed to the process is essential to operationalize any development process.

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Annexes

Table 1: Selected Descriptive Statistics

Country	Canada		Chile		Peru	
Variable	Resource Dependent	Non RD	RD	Non RD	RD	Non RD
Population change (%)	-4.27	2.86	5.14	14.30		
Poverty 2005 (2002)	8.09	7.72	30.99	28.47		
LQ primary sector	2.17	0.45	1.34	0.76	1.12	0.91
LQ manufacturing sector	0.66	1.23	0.67	1.31		
Distance to urban center	65.62	58.27	60.31	38.43	1070	1494
Incremental distance med. UC	63.61	52.64	31.83	46.97		
Incremental distance large UC	183.49	164.17	453.92	409.25		
People over 70 years old (%)	8.47	7.62	5.06	4.58	5.04	4.38
Lagged Poverty 1991 (1992)	14.60	14.02	41.10	41.45		
Unemployment (%)	10.89	16.83	8.92	9.09		
Average years of school (+ 14 y.o) *	11.09	11.33	6.10	7.11	11.85	20.52
Aboriginal population (%) **	4.42	4.68	7.01	7.03	51.09	64.55
Born in the same comuna (%)	84.63	80.66	77.22	74.83	86.77	75.06

* In Peru: Education of household head. Percentage of High School completion.

** In Peru: Language of household head. Percentage of Spanish

Table 2a: Population Change Models, Resource-Dependent Rural Communities

	Coefficients		
Canada. Chile and Peru	Canada	Chile	Peru
Lq Primary Sector	-1.995***	-19.835***	-0.24*
Lq Manufacturing Sector	0.140		
Distance To Nearest Urban Center	-0.057***	0.018	4.54
Incr. Distance To Medium Urban Center	-0.026***	-0.012	
Incr. Distance To Large Sized Urban Center	-0.017***	-0.009***	
Land Area (Km^2)	-0.000		4.66**
Mean Daily Temperature (Deg C)	-0.164		
Total Precipitation (mm)[a]	-0.000	-0.000	
Mean Elevation	0.004*		-0.06**
Unemployment 1991 (%)	-0.070	-1.777**	
Labor Force Participation	0.143***		
Job Growth 91-96[b]	0.019*	-53.137**	
Job Access 91 squared	-0.004**		
Out-Commuting Rate To Cacma	0.085***		
Incommuting Rate	0.037		
Total Population in 1991/92/93	0.001***	0.000	-0.72*
Nonfarm Self Employment (%)[c]	0.024	-9.042	
Poverty 1991/92/93	-0.049	-0.440	0.47
Average Years Of School[d]	-0.872	47.975***	-0.26
Aboriginal population (%)[e]	0.292***	-0.001	-0.04
Ethnic Diversity 1991[f]	15.763	-3.608***	
Live in a dwelling that they own (% pop.)[g]	0.015		-0.06
Living same comm. 5 Years ago (% pop.)[h]	-0.314***	-0.292**	
Agriculture (%)	0.017		
Fishing (%)	-0.259		
Logging (%)	2.683		
Mining (%)	-5.288		
(Provinces fixed effects included for Canada)			
Constant term	25.774***	-61.434	0.38
R-squared	0.453	0.331	0.488
Number of observations	930	153	99

*significant at 10%, ** 5%, *** 1%

Notes: [a]Total Precipitation (mm) was replaced with distance to the nearest lake in Chile; [b]Job growth was not available for Chile and was replaced with the Gini coefficient, 1992; [c] Lagged Poverty 1991/92 was used in Chile to replace NFS Employment; [d] Ed. Of household head (1993) replaced the years of education in Peru. [e] In Peru, aboriginal population was replaced by Percentage of Household heads whose language is Spanish; [f]

Average years education squared was included in this row for Chile; [g] Male household head (1993) was included in this row for Peru ; [h] In Chile, this variable was replaced by the % of people Born in same comuna.

Models were estimated using Robust variance estimates with regional clusters. Resource dependent communities models were estimated after a Chow Test to confirm their distinctness.

Table 2b: Poverty Models, Resource-Dependent Rural Communities

Variables	Coefficients		
Canada. Chile and Peru	Canada	Chile	Peru
Lq Primary Sector 1991	0.658	-0.104***	-0.04
Lq Manufacturing Sector 1991	0.217	-0.017	
Distance To Nearest Urban Center[a]	-0.013***	0.000	0.02
Incr. Distance To Medium Urban Center	-0.001	-0.000*	
Incr. Distance To Large Sized Urban Center	0.000	-0.000	
Poverty 1991. 1992. 1993	0.076**	0.226***	0.16
Lagged Poverty 1991. 1992 (Bw = 1.6).	0.147	0.479***	
Unemployment 1991 (%)	0.021	0.013***	
Labor Force Participation[b]	0.005	0.247***	
Job Growth 91-96	-0.007*		
Job Access 91 squared	0.001		
Out-Commuting Rate To All Places	-0.010		
Incommuting Rate	-0.012		
Population Density	-0.009	-0.000	
Nonfarm Self Employement (%)	-0.047	-0.000	
Average Years Of School[c]	-0.822***	0.077	-0.25
Aboriginal population (%)[d]	0.350***	0.003***	-0.05*
Recent Immigrants (%)[e]	0.064	-0.009	
Lone Female Headed Households (%)	-0.031	0.001	
Persons below 10 years old (%)[f]	0.043	0.011**	0.81*
Persons above 70 years old (%)[g]	-0.103	0.006	-1.47**
Living In The Same comm. 5 Years ago (%)[h]	0.026	-0.000	0.39***
Agriculture (%)	-1.723*		
Fishing (%)	-3.973***		
Logging (%)	-2.713**		
Mining (%)	-2.037*		
(Provinces fixed effects included in Canada)			
Constant term	12.876**	-0.379	0.1
R-squared	0.381	0.792	0.663
Number of observations	903	153	99

*significant at 10%, ** 5%, *** 1%

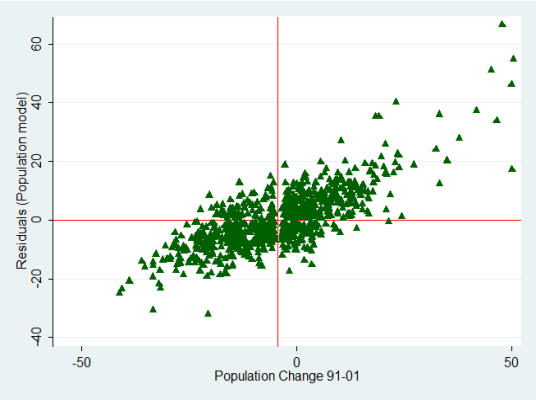
Notes: [a]This variable was replaced by Altitude in Peru; [b]Labor force participation was not available for Chile and was replaced with the Gini coefficient, 1992; [c]Ed. of household head (1993) replaced the years of education for Peru; [d]In Peru, aboriginal population was replaced by Percentage of Household heads whose language is Spanish; [e]Average years education squared was included in this row for Chile; [f] Below 13 for Peru; [g]Above 66 for

Peru; [h]In Chile and Peru, this variable was replaced by the % of people Born in same comuna or province.

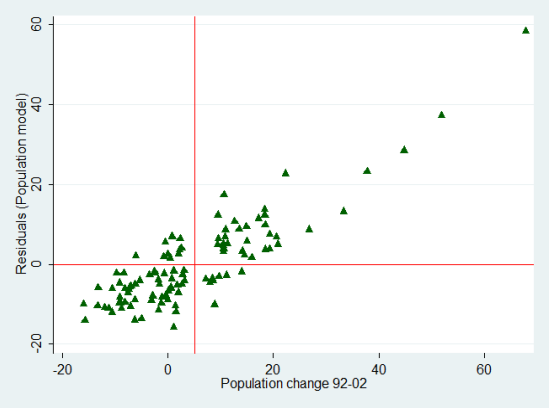
Models were estimated using Robust variance estimates with regional clusters. Resource dependent communities models were estimated after a Chow Test to confirm their distinctness.

Figure 1: Population Model, Residuals vs. Population change relative to the Mean

Panel a: Canada



Panel b: Chile



Panel c: Peru

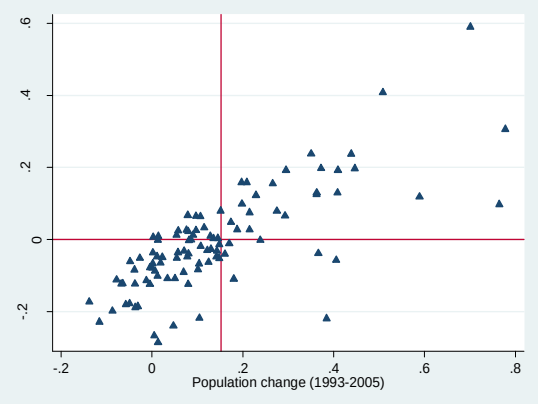
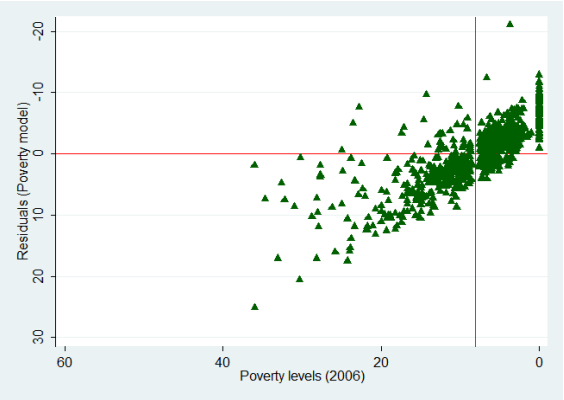
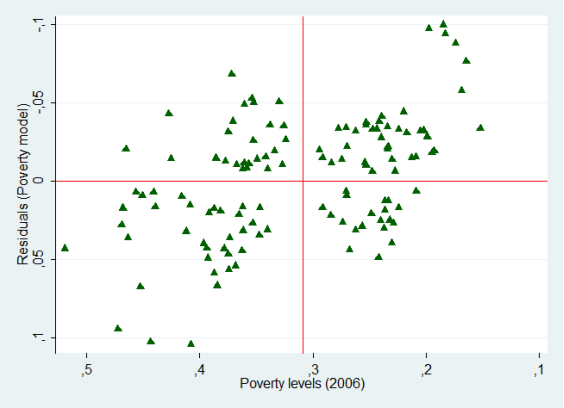


Figure 2: Poverty Model, Residuals vs. Poverty Levels Relative to the Mean

Panel a: Canada



Panel b: Chile



Panel c: Peru