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Small and medium cities and development of Mexican rural areas

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ABSTRACT

Like the rest of Latin America, Mexico is a highly-urbanized country. Yet rural populations, geographies and economic activities continue to play a significant role in national development, while there are persistent and large rural-urban inequalities in well-being and opportunities. Promoting rural-urban linkages has been proposed as a strategy to reduce spatial inequalities, but there is much academic and policy debate about whether urban development has positive (spread) or negative (backwash) effects on rural development. This could translate into synergistic or predatory urban-rural linkages. This study examines how proximity to cities, and population and per capita income in cities, affect population growth and welfare in rural places in Mexico. Using data for 2000 and 2010, our findings include: (a) 75% of rural people live within 90 min of an urban area, and 60% within 60 min; (b) proximity to a city increases rural population growth and welfare; (c) adverse (backwash) effects on rural areas due to increases in urban per capita income are very small and of no economic significance; (d) cities with populations in the 350,000–500,000 range appear to have more positive effects on rural areas than smaller or larger cities; (e) rural localities interact with multiple urban places simultaneously.

1. Introduction

Latin America[1] is one of the most urbanized regions of the world, with national urbanization rates ranging between 50% and 95% (UNDESA, 2014). Urbanization in the Latin American region is as high in North America and higher than in Europe (UNDESA, 2014).

Despite common perceptions, however, Latin American urbanization is quite decentralized in thousands of cities and towns of fewer than 500,000 inhabitants. Four of the five largest economies and 11 of the 19 Latin American countries have urban primacy rates below the global average, with Brazil and Mexico leading the trend (12% and 21% primacy rates, respectively; UNDESA (2014)). The growth of the very large megalopolises, such as Mexico City and Sao Paulo, stabilized many years ago, while rural populations continue to drop, not only in relative terms, but also in absolute numbers since 2000. Populations and possibly economies are now growing faster in medium-size cities than in larger urban conglomerations.

Since the early 2000s, a region-wide program involving more than 30 partners has been studying why certain sub-national regions, defined as territories (Schejtman & Berdegué, 2003), show development dynamics that have led to *socially inclusive economic growth* (i.e., economic growth with a reduction of poverty *and* inequality). An analysis of more than 10,000 municipalities or their equivalents in 10 countries showed that only 12% experienced socially inclusive economic growth between the mid-1990s and mid-2000s (Modrego & Berdegué, 2015). Case studies for 20 territories dispersed throughout the region showed that the presence of, and linkages with, nearby cities appear to be one of the key factors explaining the differences in territorial social inclusiveness and economic growth (Berdegué, Carriazo, Jara, Modrego, & Soloaga, 2015). Country-wide studies of decade-long development dynamics of functional territories in Chile, Colombia and Mexico have shown that rural-urban territories (i.e., those in which an urban core is functionally connected, through a dense set of interdependencies, with a number of surrounding rural localities), significantly outperformed purely rural territories in terms of poverty reduction and economic growth, an effect that correlated positively with the size of the urban core (Berdegué, Escobal, & Bebbington, 2015).

There is also a body of literature that studies rural-urban interactions in developed countries. Using models that link non-metropolitan to metropolitan areas in the United States of America between 1950 and 2000, it was found that non-metropolitan areas farther from higher tiered urban areas had lower population growth. This negative effect increased over time, perhaps because

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[1] We refer to the 19 Spanish- and Portuguese-speaking countries in the Western hemisphere.

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of the centralizing effect of new technology in a mature USA urban system (Partridge, Rickman, Ali, & Olfert, 2008). Using similar models, Ganning, Baylis, and Lee (2013) found that USA non-metropolitan areas are influenced by multiple cities, rather than only the nearest city; this points to a need for collaborative, inter-urban public policy approaches to non-metropolitan development. Behind these findings lies the fact that proximity to cities provides not only markets for goods produced in rural areas, but also opportunities to diversify income sources from non-rural employment (Evans, 1990; De Janvry & Sadoulet, 2001).[2] Non-agricultural rural income is also becoming more important than agricultural income in many parts of Latin America (Reardon, Berdegué, & Escobar, 2001), as in Africa and Asia (Reardon, Taylor, Stamoulis, Lanjouw, & Balisacan, 2000). It is not surprising, then, that distance to urban centers is a constraint on rural development. Wu and Gopinath (2008) found that remoteness was the primary cause of spatial disparities in economic development in the USA, while Christiaensen and Todo (2013),using a cross-country panel data approach for developing countries, found that migration out of agriculture into the "missing middle" (i.e., the rural nonfarm economy and secondary towns) translates into more inclusive growth than agglomeration in megacities.

There is therefore sufficient evidence to suggest that more inclusive economic growth can be promoted by stronger rural-urban relationships. Nonetheless, rural-urban relationships can sometimes be predatory (i.e., when the city grows, its hinterland loses). Balancing the positive and negative effects of rural-urban interactions is difficult under the best of circumstances, and it is particularly important for developing regions where significant rural population and activities co-exist with urban growth. Understanding what types of development dynamics in cities may stimulate growth and improve well-being in surrounding rural areas is a relevant policy and research question.

Mexico is a middle-income country where more than 20% of the population lives in rural areas. There are high levels of both international and domestic (interstate) migration (Soloaga, Lara, & Wendelspiess, 2010). In recent years, population growth has been occurring mainly in medium size cities influenced by the development of new manufacturing industries, the intensification of old ones (mostly *maquiladoras*) and services. The effects of these dynamics on the country's considerable rural areas and populations are not fully understood.

Our research questions are:

1. What effect does living close to a small to medium urban center, compared to a large city, have on rural inhabitants' development opportunities and well-being?
2. What effects do *changes* in small and medium cities have on rural inhabitants' development opportunities and well-being, compared with the effects of changes in large cities?

From a public policy perspective, it is important to assess whether results found for developed countries hold for Mexico. We find that they do, and that rural areas interact with multiple cities simultaneously, not just with the closest one. Moreover, proximity to mid-range cities (i.e., those with a population of between 350,000 and 499,999) offers greater potential for rural development. A rural locality that is close to an urban area with a population of 350,000 or more could experience population growth that is 10 to 18 percentage points higher, over 10 years, than that of a more distant locality. Five additional percentage points could come from population growth in those urban areas (spread effects). Although we also find backwash effects on rural areas from increments in urban per-capita income growth, these are quite small. Population growth in rural areas seems to be driven mainly by changes in population growth in urban areas and by distances to them.

2. Method

To answer the research questions, we first classify Mexican territories into rural, rural-urban and urban. We begin by applying the ArcGIS Network Analyst software to the national road database from Mexico's Secretariat (ministry) of Communications and Transportation and microdata from the 2010 Population Census to compile a matrix of distance and travel time for all rural and urban locations with populations greater than 100 inhabitants. The 50,030 localities in the matrix (including 59 officially-designated metropolitan areas) contain 97% of the country's population.

Mexico's National Urban System (in Spanish, *Sistema Urbano Nacional,* or SUN) includes 384 urban areas with a population exceeding 15,000 inhabitants, while smaller localities are considered rural (SEDESOL, CONAPO, & INEGI, 2012). For our empirical approach, we follow this characterization and define rural localities (RL) as those with fewer than 15,000 inhabitants (Type0 for short) and urban localities (UL) as those with 15,000 or more inhabitants. Several UL are made up of several individual localities that form conurbations (i.e., an aggregation of two or more municipalities that include multiple cities). Thus, the term UL identifies either a single locality or a conurbation. We identify seven types of UL, by population: i) between 15,000 and 49,999 (Type1), ii) between 50,000 and 249,999 (Type2), iii) between 250,000 and 349,999 (Type3), iv) between 350,000 and 499,999 (Type4), v) between 500,000 and less than 1 million (Type5), vi) between 1 and less than 5 million (Type6) and, vii) more than 5 million (Type7).[3]

To answer the research questions, we use as a starting point the work of Partridge, Bollman, Olfert and Alasia (2007) and Partridge et al. (2008). Their models examine how proximity to urban agglomerations affects population growth in hinterland counties. We follow Ganning et al. (2013) modification of those models and adjust them to analyze not only changes in population levels, but also effects on welfare indicators. The working hypothesis is that changes in key variables in a given RL are influenced by changes in the characteristics of *relevant* UL. One key consideration is to identify which are the *relevant* UL for each RL. The approach follows the Central Place Model (CPM) and considers that there is a hierarchy of UL based on the assumption that urban areas with larger populations offer more sets of goods and services than are available in urban locations with smaller populations. Using this approach, if a given RL is closer to, say, a Type3 UL, any influence coming from Type1 or Type2 UL is ignored. We considered this assumption too restrictive and implemented a general version that tests whether the hierarchy implied by the CPM holds.

The general formulation of the econometric approach for these two models is as follows:

$$\%\Delta Y_{2000\ y\ 2010,is} = \propto + \beta DIST_{i \to T_j} + \gamma GEOG_{i,2000} + \Delta MKT_{T_{j,2000}} + \theta \Delta MKT_{T_{j,2000\ y\ 2010,}} + \sigma_s + \in_{ist},$$

[2] Issues well covered in the literature on urban agglomeration and externalities are also very important in these rural-urban interactions. Reviews are presented, for example, in Berdegué, Carriazo, et al. (2015) and Ganning et al. (2013).

[3] OECD (2013) presents the following classification for OECD countries, including Mexico: *"Small urban areas, with a population below 200 000 people; Medium-sized urban areas, with a population between 200 000 and 500 000; Metropolitan areas, with a population between 500 000 and 1.5 million; Large metropolitan areas, with a population of 1.5 million or more."* To gain a better understanding of how different urban population sizes affect non-urban ones, we use finer categories in this paper.