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Comparative spatial inequality dynamics: The case of Mexico and the United States

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ABSTRACT

In this paper we examine the trajectory of regional income inequality dynamics for two neighboring national systems. Using data on 3038 US counties and 2418 Mexico municipios, from 2000, 2005, and 2010, we employ recent extensions of spatial Markov chains and space-time mobility measures, to consider the following questions: Are regional inequality dynamics fundamentally distinct between Mexico and the United States? Does the role of spatial context influence the distributional dynamics of the two systems? Finally we examine if there is a distinct international border region that displays inequality dynamics different from those of the internal regions of the two national systems. Strong evidence of spatial heterogeneity in regional income mobility is found between the two national systems, with Mexico having higher mobility relative to the US. The international border region is found to have distinct mobility dynamics from either national system, experiencing the strongest mobility. Extensive evidence of spatial contextual effects are found throughout the US-Mexican pooled data set indicating that a region's transitional dynamics are influenced by incomes of neighboring regions.

Introduction

The debate about changes of interpersonal and interregional inequality has been active for at least a fifty year span (Amos Jr., 1988; Hughes, 1961; Krebs, 1982; Kuznets, 1955; Williamson, 1965). Following the difficulties in empirically contrasting the main premise, namely, that inequality will tend to decrease with development levels, and erratic evidence about the mechanisms for this latter to hold, interest has continued in two broad directions. A theoretical perspective has revived the discussion on the relationship between growth and inequality (Aghion & Williamson, 1998; Quah, 2003), while a regional view has focused on the enduring nature of regional inequality in some areas (Fan & Casetti, 1994; Kanbur & Zhang, 2005) and the effects of more recent global dynamics on regional disparities (Dobson & Ramlogan, 2009; Krugman & Venables, 1995; Silva & Leichenko, 2004). In regional studies, the question continues to be linked mostly to structural development levels and regional differentiation (Costa, 2011; Kanbur & Venables, 2005; Scott & Storper, 2007; Venables, 2005; Wan, Lu, & Chen, 2007; Zhang & Zhang, 2003), and there is a renewed interest in policy related questions addressing the regional issue (Fan, Kanbur, & Zhang, 2009; Wei, 2002).

With the theoretical recognition of accompanying contextual effects, particularly in regional growth processes (Krugman, 1990, 1997, 1999), but also in interaction-based approaches in social dynamics (Blume & Durlauf, 2001), the interest has also turned to spatio-temporal inquiries around these issues (Fan & Casetti, 1994; Li & Wei, 2010). Within this recent dynamic perspective, studies concerned with regional inequality have found in parametric approaches a new set of testable hypothesis reflecting temporal disequilibrium. The use of regressions of regional growth on initial levels of income has been extensive in testing the probability of *catching up* or, so called, regional convergence (Barro & Sala-i-Martin, 1992). Despite its attachment to formal growth theories and thus, well defined transition dynamics, the approach has proven to be limited to the investigation of many of the previous questions, involving dynamics in subsets of economies that are likely to differ over space. This has been accompanied by new growth theories which have a particular attachment to mechanisms that are geographically localized (Aghion, Howitt, & García-Peñalosa, 1998). On the empirical front, evidence of weaknesses within the convergence framework, among them, the presence of

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rigidities (as opposite to mobility) in transition dynamics has been frequently revealed, challenging explanations of transient distributional characteristics predicted by a neoclassical approach.

These latter shortcomings have motivated the emergence of a relatively new thread in the literature referred to as a *distributional dynamics* approach to convergence (Durlauf, Johnson, & Temple, 2005). From an initial focus on a measure of dispersion, so called $\sigma-$ convergence, the empirical approach has greatly evolved over the last two decades. Within this framework, a particular interest in spatial processes as intervening dynamics was first visible in a critique to traditional approaches (Quah, 1993b), followed by revised empirics (Quah, 1996b) which seek to integrate the relevance of contextual effects. This methodological focus was further developed with measures where spatial relationships, and dynamics involved, are more fully captured (Rey, 2001, 2004b). This has allowed the identification of a new range of intra-distribution dynamics which are sensitive to the spatial context (Rey, 2001). This has also posed new questions on the relationship between space and regional inequality (Novotnỳ, 2007; Rey, 2004a; Rey & Sastré-Gutiérrez, 2010) and convergence (Rey & Janikas, 2005; Wei & Ye, 2009).

In this paper we seek to contribute to the distributional dynamics literature by adopting a comparative perspective. To do so we examine the trajectory of regional income inequality dynamics for two neighboring national systems, the United States and Mexico. Employing recent extensions of spatial Markov chains and space-time mobility measures in distributional dynamics (Rey, 2001, 2004b), we consider the following questions:

- Are regional inequality dynamics fundamentally distinct between Mexico and the United States?
- What role does spatial context play in shaping the distributional dynamics of the two national systems?
- Is the bi-national border region a third system that displays distinct inequality dynamics from those of the internal regions of the two countries?

The remainder of the paper is organized as follows. In Section 2 we provide an overview of the regional context for our work. The empirical strategy, data sources and analytical methods are discussed in Section 3. The results of our analysis are then presented in Section 4, and the paper concludes with a summary of key findings and discussion of directions for future research.

Background

Comparative Mexico and US regional dynamics

The rich history between Mexico and the US can be traced over a number of periods. One of them involves several interconnected events back to the colonial past in Mexico and civil wars in both countries. Another encompasses a more contemporary set of events, relating to adjustments to global dynamics, such as opening processes and regional restructuring. Structural (and historical) aspects are fundamental when discussing factors shaping regional differences in living standards in both countries. In Mexico, the focus has been mainly on a north-south divide (Alba, 1999; De Appendini, Murayama, & Domínguez, 1972; Hernández Laos, 1984; López-Alonso, 2007). The northern states that share a border with the U.S. have displayed higher performance relative to the southern states. Herzog (1990) [p. 4], refers to the national economic development program conducted in Mexico during the second half of the twentieth century as, "…directed at expanding, economically fortifying, and physically redeveloping cities lying on the northern frontier." In the US, on the other hand, states transitioned through a concentration of economic activities in the Northeast and Midwest that started during the nineteen century, followed by what has been termed a polarization reversal (Fan & Casetti, 1994) that resulted in new cores of activities in the South and West. A similar effect occurs in Mexico a couple of decades later, as strong evidence also points to a shift of the core of the economic activity from the center of Mexico to the northern part of the country, initiated with the unilateral opening process during the mid 1980s and intensified after the North American Free Trade Agreement (NAFTA).

Since the NAFTA between the United States, Canada and Mexico was put into force in 1994, the question of intranational income dynamics has attracted substantial attention. This has had several motivations stemming from remarks by influential international trade theories regarding regional impacts through opening processes (Krugman & Venables, 1995), and mixed evidence drawn from regional processes operating in Mexico. On one side are findings about a reversion of income convergence among the Mexican states, which is frequently linked with the aftermath of liberalization reforms in the country (Chiquiar, 2005; Messmacher, 2000; Sánchez-Reaza & Rodríguez-Pose, 2002). Arguably, some of these regional responses also reflect the outstanding conditions of the northern border area of Mexico (Krugman & Hanson, 1993; Venables, 2005). Meanwhile, recent studies refer to regional disequilibrium also on structural or historical grounds (Aroca, Bosch, & Maloney, 2005; Rey & Sastré-Gutiérrez, 2010). These studies point to a strong north-south gradient -prior to NAFTA- influencing overall regional divergence (Aroca et al., 2005), with the genesis of such pattern to be found in uneven regional distributive policies during the 1940s.

On the other hand, many of these previous studies have suggested a range of potential interdependencies operating between regional systems, Mexico and the United States, across various spatial socioeconomic dimensions and scales. These latter notions are largely descriptive and are still lacking a formal analytical treatment and associated inferential framework. In other words, these ideas have not been conclusive about the extent and nature of those forces (if existent), their strength and *relative* importance.

From the standpoint of spatial statistics, several aspects remain unexamined. We are uncertain to what extent significant spatial effects are present in the area, and how they may affect spatial dynamics in the rest of the regional systems (if such bi-national spatial regimes do, in fact, exist). For example, would the spatial dynamics of some of the Mexican northern states change if we metaphorically modify their neighborhood from having US states to having Mexican states as neighbors? Nor do we know if the probabilities of poor US counties improving their income are affected by having poor (or rich) municipios as neighbors in the Mexican side of the border. We also wonder how spatial dynamics in the hinterlands of both countries, might change if, for instance, their vicinity with the other country was removed. Identifying local spatial dynamics could help to set up useful benchmarks to add to studies that implicitly have posed these questions.

A regional border system?

The recent *spatial turn* in many fields is rapidly contributing to the emergence of research questions which increasingly have a composite nature (Jessop, Brenner, & Jones, 2008; Pries, 2005). As stated by sociologists, the study of spatial inequality has the advantage of broadening our knowledge of social inequality (economic well-being, access to resources, class, etc.) to more fully understanding of uneven development (Lobao, Hooks, & Tickamyer, 2007a). This same strand of the literature has increasingly recognized the usefulness of scale analysis as a mean to