

Regional inequality and convergence in large emerging economies: Evidence from the BRICs

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All large economies are faced with regional income disparities due to a variety of economic, financial, geographical, and institutional factors. But in emerging economies this issue is considerably more urgent because certain regions have been exhibiting disproportionately high growth rates over the past two decades that have led to a rapid polarization of the income distribution. While rich countries have established mechanisms to redistribute income across regions through various grant programs, the fast growth in emerging economies coincided with a decentralization drive that gave regions more control over their resources. This process coupled with an inadequate system of interregional transfers exacerbated existing regional inequalities.

The goal of this paper is to examine the evolution and determinants of the regional distribution of output per capita in four major emerging economies (Russia, China, India, and Brazil) over the 1990s and 2000s. In particular, we take advantage of a novel methodology to study the shifts and changes in the shape of the distribution as well as the convergence tendencies of regional income. Moreover, we use regression analysis to identify the determinants of distribution dynamics among various economic, demographic, environmental, social, and institutional factors. A number of previous studies have investigated regional inequality and convergence in China (Liu, 2010; Hering and Poncet, 2010), India (Barua and Chakraborty, 2010; Das et al., 2010), Russia (Hanson, 2006; Fedorov, 2002), and Brazil (Azzoni, 2001; Neto and Azzoni, 2011). In addition, several works have conducted comparative analysis of these issues across some of the four economies in the sample. For instance, Akita (2003) examined regional income disparities in China and Indonesia, while Badunenko and Tochkov (2010) decomposed regional growth in China, Russia and India and measured the effect of each component on inequality.

In contrast to existing studies, the paper employs a non-parametric methodology that allows us to explore the entire distribution of output per capita and its dynamics over time rather than just the first two moments of the distribution. The shape of the distribution and its evolution

are investigated in discreet and continuous space. In particular, we use Markov transition matrices and stochastic kernels to estimate the probability of a region moving from an initial level of output per capita toward or away from the median. A second advantage of the paper over previous works is the comparative nature of the analysis that enables us to study the convergence tendencies across regions in all four emerging economies over the same period of time in the 1990s and 2000s using a uniform methodology. Lastly, a unique dataset of variables covering various aspects of the economic and institutional framework in which regional economies function helps us identify those factors with the greatest probability of influencing distribution dynamics.

A variety of methods have been used in the literature to study convergence. Earlier studies tested for the existence of a negative relationship between the average income growth over a period of time and the initial level of income, which became known as *beta*-convergence (Barro and Sala-i Martin, 1992). Other papers emphasized the importance of the decrease in dispersion of per-capita income across countries (Friedman, 1992; Quah, 1993a). A third group of studies examined whether stochastic shocks that cause income differentials across countries are temporary in nature and would thus have no effect on convergence in the long run (Bernard and Durlauf, 1995; Evans, 1998). In contrast to the aforementioned efforts, this paper employs a completely different non-parametric methodology. In a series of seminal papers, Quah (1993, 1996, 1997) criticized the standard econometric approach to income convergence, arguing that its focus on the first and second moments of the income distribution describes the dynamics of a representative economy but fails to characterize the evolution of the entire income distribution over time. Instead, Quah used stochastic kernels to study changes in the external shape of the entire distribution as well as intradistributional mobility, which allowed him to detect convergence clubs indicating the existence of multiple steady states. Following Quah (1996b, 1997), we use kernel density estimates to examine the shape of the regional income distribution and employ transition probability functions to investigate distributional dynamics and intradistributional mobility in four large emerging economies.

Although China, India, Russia, and Brazil exhibit rapid growth and face similar problems regarding regional income disparities, the results reveal different patterns of shifts within the regional income distribution across the four countries. China and Brazil represent the two extremes. China's regions with below-median output per capita have the highest probability of

transitioning towards higher income levels, while their Brazilian counterparts are almost completely trapped at the bottom of the distribution. Moreover, although in both countries there are strong convergence tendencies, these lead in China to a concentration of probability mass at the top income levels in the long run, while the majority of regions in Brazil end up in a steady state at the bottom of the distribution. Although India has the lowest and Russia one of the highest regional income inequality levels in the sample, they display similar divergence patterns exemplified by high persistence at both ends of the distribution. The high mobility in the middle is directed towards the top and the bottom income levels resulting in the long run in a bimodal distribution with a larger poor mode.

Our findings further indicate that government spending and the rule of law are the major driving force behind regional convergence, except in Russia where they have the opposite effect. Innovation and property rights also promote convergence in China, but cause regional divergence in India. A larger share of SOE increases the likelihood that rich provinces will move down toward the median, while trade strengthens tendencies in the opposite direction. From a policy perspective, the most relevant variables are those that help regions with initial below-median output per capita improve over time without necessarily constraining the growth of rich regions. Our analysis identified government spending and the rule of law (in China and India), FDI (in Russia and Brazil), innovation (in China and Russia), and health (in China and Brazil) as potential factors in this category.