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Productivity and convergence in India: A state-level analysis

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ABSTRACT

Total factor productivity plays an important role in the growth of the Indian economy. Using state-level data from 1993 to 2005 that were recently made available, we find widespread regional variation in productivity changes. In the years immediately following economic liberalization, productivity growth improved technical efficiency; however, in subsequent years, productivity growth was propelled by technological progress. We find a tendency toward convergence with regard to productivity growth among states; however, the states that were technically efficient when the economic reforms were instituted remained innovative in later years.

1. Introduction

Balanced regional development has always been one of the major objectives of India's national policy. In the post-liberalization period (post-1991), there has been a significant increase in the economic disparity between the states (Rao, 2008). Approximately 72% of India's poor, and half of its population is located in six states: Uttar Pradesh (including Uttaranchal), Bihar (including Jharkhand), Madhya Pradesh (including Chhattisgarh), Maharashtra, West Bengal and Orissa. Previous analyses measuring the effects of economic reforms on economic performance have largely considered either the economy as a whole (e.g., Bosworth et al., 2007) or individual sectors (e.g., Goldar, 2004; Kumar, 2006, for the manufacturing sector). In the literature, only a few attempts have been made to explicitly analyze regional growth (e.g., Ahluwalia, 2000; Sachs, Bajpai, & Ramiah, 2002). Moreover, economic liberalization enhances interstate competition while minimizing the role of the central government in reducing regional imbalances through regulation. The gains from competitive federalism are linked to the relative strength of competing jurisdictions (Breton, 1996). Therefore, an analysis that measures increases in total factor productivity (TFP) at the state level should be of special

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interest because one of the major objectives of the 1991 economic reforms was to improve the productive efficiency of the economy.

The purpose of this paper is to provide empirical evidence of patterns of TFP growth within the Indian states in the post-liberalization era using the Malmquist productivity index. The advantage of this approach is that it facilitates the decomposition of TFP changes into technical changes (TC) and efficiency changes (EC). Because TC and EC are associated with technological innovation and adoption, respectively, the dynamics of the recent economic growth in the Indian states can be better understood if we consider these two types of changes. Moreover, the Malmquist index approach differs from the competing approaches in that it does not make any unrealistic assumptions regarding the absence of technical and allocative inefficiency of production.

We use data from 1993 to 2004[1] to measure the annual rates of change in productivity and technical efficiency of individual Indian states. The results of this study show that the annual rate of productivity growth has, on average, improved over time even though some states have experienced a slowdown or even a decline in productivity. The paper also investigates the causes of productivity divergence among the states in light of the convergence and divergence hypotheses. The results reveal that the differences between the states with regard to their productivity are a function of the policies and institutions that help to increase the human development index. It is also observed that increases in TFP at the state level are positively associated with the degree to which a state has embraced the economic reforms.

This paper is organized as follows. A brief review of existing literature is presented in Section 2. The methodology and data used in the study are described in Section 3. Section 4 discusses the productivity of the states from 1993 to 2004. Some concluding remarks are provided in the final section of the paper.

2. Economic growth and productivity: background

The variability and volatility in growth rates across the Indian states have received significant attention in recent years. Productivity analysis makes it possible to understand the variability and volatility of growth rates. Therefore, it is important to determine which factors affect productivity growth in the Indian states.

2.1. Neoclassical growth theory

Growth and variability in productivity across countries have been analyzed from various theoretical perspectives. This paper focuses on the neoclassical and endogenous growth theories in addressing the variability in the productivity of the Indian states. The neoclassical growth theories first emerged in the work of Solow (1956). The marginal product of capital is low in high-income countries because these countries exhibit a high capital labor ratio, but it is high in developing countries, where the capital labor ratio is low. The higher marginal product of capital should generate a higher growth rate for income in developing countries as compared to developed countries (Evans & Karras, 1996). This phenomenon is known as the convergence hypothesis in the economic growth literature. The convergence hypothesis states that productivity in low-income countries tends to converge with that of high-income countries (Baumol, 1986; Baumol, Blackman, & Wolff, 1989). The convergence hypothesis is fundamentally linked to the concept of diminishing returns to capital.

Much of the literature on growth regression is influenced by the convergence hypothesis (Barro, 1991; Barro & Sala-i-Martin, 1992). Barro, Mankiw, and Sala-i-Martin (1995) find the presence of convergence independent of the sources of capital—whether domestic savings or in-flows from abroad. The hypothesis also finds support in growth accounting exercises (e.g., Young, 1995). Although the convergence hypothesis is able to explain the growth phenomenon within Organisation for Economic Co-operation and Development (OECD) countries to some extent, it fails to explain the differences observed in the growth paths of most developing countries.

2.2. Endogenous growth theory

The endogenous growth theory originated in the work of Arrow (1962) and was further developed by Lucas (1988) and Romer (1990). This theory states that the differences between developed and developing countries with regard to productivity remains constant or even increases over time. This occurs due to the economies of scale that arise with the acquisition of technical knowledge. The accumulation of knowledge helps to increase productivity at the aggregate level even when individual firms face diminishing returns to capital. Thus, the diminishing returns to scale disappear, and the growth paths of developing economies diverge from those of developed countries.

Based on the concept of endogenous growth the phenomenon of convergence can be viewed as a technological catch-up effect. The argument is that imitations are faster and less costly than innovations. Thus, poor countries, which lie below the world technology frontier, may make technological progress more rapidly than the more technologically advanced

[1] The annual data in India are reported for the fiscal year rather than the calendar year. The fiscal or financial year is the 12-month accounting period that begins on April 1 and ends on March 31 of the following year. Therefore, data are reported for ranges such as 1993–1994. For the sake of convenience, in what follows, we refer to the 1993–1994 period as 1993, for example.