



## Deconstructing the BRICs: Structural transformation and aggregate productivity growth

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### ABSTRACT

**de Vries, Gaaitzen J., Erumban, Abdul A., Timmer, Marcel P., Voskoboynikov, Ilya—**Deconstructing the BRICs: Structural transformation and aggregate productivity growth

This paper studies structural transformation and its implications for productivity growth in the BRIC countries (Brazil, Russia, India, and China) from the 1980s onwards. Based on a critical assessment of the reliability and consistency of various primary data sources, we bring together a new database that provides trends in value added and employment at a detailed 35-sector level. Structural decomposition analysis suggests that for China, India and Russia reallocation of labor across sectors is contributing to aggregate productivity growth, whereas in Brazil it is not. This confirms and strengthens the findings of McMillan and Rodrik [NBER Working Paper 17143, 2011]. However, this result is overturned when a distinction is made between formal and informal activities within sectors. Increasing formalization of the Brazilian economy since 2000 appears to be growth-enhancing, while in India the increase in informality after the reforms is growth-reducing. *Journal of Comparative Economics* 40 (2) (2012) 211–227. Groningen Growth and Development Centre, Faculty of Economics and Business, University of Groningen, The Netherlands; Institute of Economic Research, Hitotsubashi University, Tokyo, Japan; The Conference Board China Centre, Beijing, China; Laboratory for Inflation Problems and Economic Growth, Higher School of Economics, Moscow, Russia.

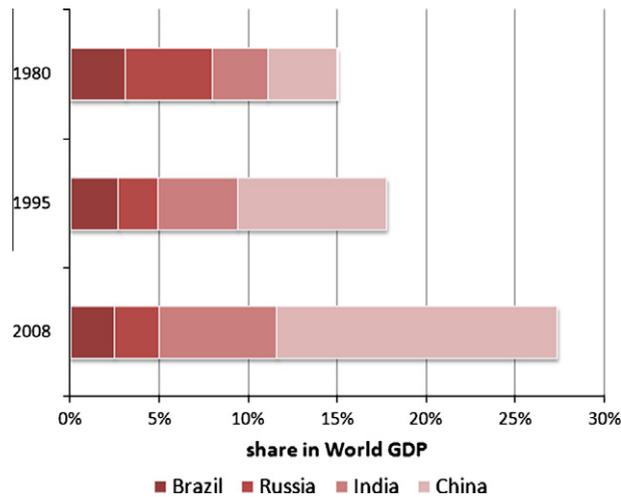
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### 1. Introduction

A central insight in development economics is that development entails structural change. Structural change, narrowly defined as the reallocation of labor across sectors, featured prominently in the early literature on economic development by Kuznets (1966). As labor and other resources move from traditional into modern economic activities, overall productivity rises and incomes expand. The nature and speed with which structural transformation takes place is considered one of the key factors that differentiate successful countries from unsuccessful ones (McMillan and Rodrik, 2011). Therefore,

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**Fig. 1.** Share of the BRIC countries in world GDP. Note: Total GDP, in millions of 1990 US\$ (converted at Geary Khamis PPPs). Source: The Conference Board total economy database, September 2011.

new structural economists argue that production structures should be the starting point for comparative economic analysis and the design of appropriate policies (Lin, 2011).<sup>1</sup>

Technological change typically takes place at the level of industries and induces differential patterns of sectoral productivity growth. At the same time, changes in domestic demand and international trade patterns drive a process of structural transformation in which labor, capital and intermediate inputs are continuously relocated between firms, sectors and countries (Kuznets, 1966; Chenery et al., 1986; Harberger, 1998; Hsieh and Klenow, 2009). One of the best documented patterns of structural change is the shift of labor and capital from production of primary goods to manufacturing and later to services. This featured prominently in explanations of divergent growth patterns across Europe, Japan and the U.S. in the post-WW-II period (Denison, 1967; Maddison, 1987; Jorgenson and Timmer, 2011). Another finding is that in low-income countries the level and growth rate of labor productivity in agriculture is considerably lower than in the rest of the economy, reflecting differences in the nature of the production function, in investment opportunities, and in the rate of technical change (Syquin, 1984; Crafts, 1984; Gollin et al., 2011). Together these findings suggest a potentially important role for resource allocation from lower to higher productive activities to boost aggregate productivity growth. Based on the sector database of Timmer and de Vries (2009), the IADB (2010) and McMillan and Rodrik (2011) found that structural change was contributing to productivity growth in Asia; whereas it was absent or even reducing growth in Africa and Latin America. Also Bosworth and Collins (2008) found strong growth-enhancing structural change in China and India.

So far, however, analyses of structural change in developing countries are constrained by the availability of detailed sector data, obscuring a proper assessment of the role of structural transformation in driving aggregate productivity growth. Typically, data is only available for broad sectors such as agriculture, industry and services, hiding important reallocations that can take place, for example from low-productive garment making to high-productive transport equipment manufacturing. Also a distinction between formal and informal activities within a sector, say informal and formal textile manufacturing may have important consequences for our understanding of the effects of structural change on aggregate growth. Productivity growth in the formal sector could go hand-in-hand with a substitution of capital for labor and thereby a push of employment into low-productive informality, but such reallocation effects would not be picked up in an aggregate analysis.

This paper addresses these issues by studying the role of structural change for growth in four large developing countries, the BRIC countries: Brazil, China, India and Russia. The acronym BRIC was invented by Jim O'Neill in 2001 to group these four developing countries because of their recent growth spurts and potential for future domination of the world economy due to their population and economic size. Economic growth in China and India in particular has been well above world average, and provides a foundation for the growth of world GDP. Fig. 1 shows that the share of the BRICs in world GDP increased from about 15% in 1980 to 27% in 2008.

To analyze the role of structural change in BRICs' growth, we present a harmonized time-series database of value added and persons engaged with a common detailed 35 sector classification (ISIC revision 3). The dataset builds upon the time-series of broad sectors for China and India by Bosworth and Collins (2008) and for Asian and Latin American countries by Timmer and de Vries (2009). It adds further detail and harmonizes the measurement of output and employment across countries, which is important for a comparative and more fine-grained analysis of economic growth and production. Data

<sup>1</sup> For a discussion of policies to promote diversification, see Cimoli et al. (2009) and the symposium around Lin's paper (2011) in the World Bank Research Observer.

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