



Structural change, productivity growth and industrial transformation in China[☆]

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ABSTRACT

China's industry has experienced robust growth under persistent structural reform since 1978. By estimating the stochastic frontier sectoral production function, we find that the TFP growth has exceeded the quantitative growth of inputs since 1992, but the contribution of productivity to output growth declines after 2001. Using a decomposition technique, we then find that the structural change has contributed to TFP and output growth substantially but also decreasingly over time. Empirical analysis reveals that the reforms in factor markets and industrial structure significantly account for the overall trend and the sectoral heterogeneity of factor allocative efficiency during the industrial transformation process.

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1. Introduction

Kuznets (1979) states that “it is impossible to attain high rates of growth of per capita or per worker product without commensurate substantial shifts in the shares of various sectors.” From this perspective, China presents a fortuitous research case because its economy has performed spectacularly well since its structural reform from central planning to markets in 1978. Between 1978 and 2008, China's GDP grew at 9.9% per year and became much more stable than before. Meanwhile, China's economic transition also underwent dramatic and continuing structural changes. By structural change we mean that production factors are reallocated from less productive industries or sectors to more productive ones.

The hypothesis that structural change is an important source of growth was initially developed in Lewis' classical models of a dual economy (Lewis, 1954) and is a central element in Maddison's growth-accounting literature (Maddison, 1987). The effect of structural change and factors reallocation in the theory of economic development is extensively used by Chenery, Robinson, and

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Syrquin (1986) and Syrquin (1995), who show that it is an important factor explaining growth performances. The models of industrial development proposed by Lucas (1993) from the supply side and Verspagen (1993) from the demand side also stress the importance of structural change in productivity growth. Harberger (1998) vividly presents a “mushroom-process” where continuous factors shifts into specific dynamic sectors drive growth and then productivity varies considerably across sectors. This vision of growth contrasts with a “yeast-process” in which economy-wide growth tendencies predominate. Many researchers have found that the effect of structural change and factors allocation on economic performance is significantly positive (Akkemik, 2005; Berthelemy, 2001; Nelson & Pack, 1999; Ngai & Pissarides, 2007). Some researchers find that the effect does not exist or is very small (Caselli, 2005). In the examination of the role of structural change in productivity growth in the manufacturing sector of the four Asian NIEs, Timmer and Szirmai (2000) refer to this positive effect of factor reallocation across sectors on industrial growth as the structural-bonus hypothesis. This terminology has extensively been used since then.

In the case of China, the central government opted for the heavy-industry-oriented development strategy to catch up with the developed world after the overthrow of infant capitalism and 3 years of land reforms over half a century ago. The strategy of utilizing China's comparative disadvantage has resulted in the persistence of a dual economy, leading to massive distortion in the factor market. The danger of the imminent collapse of China's economy pushed the central government to commence economic reforms since 1978. The evolution of China's market economy from its old system necessitated profound structural changes. As shown in Fig. 1, for example, there is a substantial fall in the share of labor force in primary industry from 83.5% in 1952 to 39.6% in 2008 and a steady increase in tertiary industry, broadly consistent with the general characteristics of the structural transformation process documented in the literature of transitioning economies. The composition of labor force in second industry increased continuously from a low of 7.4% in 1952 to a peak of 27.2% in 2008 which is different from the experience of industrialized economies with a hump-shaped pattern. This indicates that China's industrialization is still in the early phase and has room to absorb more labor and further develop its labor-intensive sectors. Corresponding to this structural change, the share of industrial value-added has increased from a low of 17.6% in 1952 to a high of 44.1% in 1978 under the catch-up strategy and has remained stable around 40% until today. The share in primary industry decreased continuously to only 11.3% in 2008 while the share in services also grew sharply after the reform.

Many researchers investigate the effect of structural change across three strata of industry or across regions on China's productivity growth and economic performance; for example, see Fan, Zhang, and Robinson (2003), Fleisher and Yang (2003), Wu and Yao (2003), Heckman (2005), Au and Henderson (2006), Bhaumik and Estrin (2007), Bosworth and Collins (2008), Gong and Lin (2008), to name a few. They do not discuss the factor shifts across industrial sectors. Economists also believe that resources are restricted within sectors, and as the industrial development literatures suggest, it is necessary to reallocate the factors across sectors to boost industrial productivity and output growth. Moreover, China is on its way towards industrialization and the industry is the principal part of the Chinese economy. Industrial reform truly reflects China's entire transition experience; therefore, this paper emphasizes the structural reform in China's industry and assesses its affect on industrial development. Though scholars acknowledge the importance of structural change on industrial growth, very few researchers have tried to quantify the contribution to growth from restructuring the industrial structure and reallocating factors across sectors over time. To fill the gap, our study investigates the structural impact during the entire reform period (1980–2008) using the input and output panel of 38 two-digit industrial sectors in China. This differs from studies using aggregate data, which is unable to reveal the sectoral heterogeneity. We also do not choose the firm-level data due to its unavailability in the former two decades of reform period (1978–1998) and then its inability to capture the entire picture of Chinese industrial reform. To evaluate the factor allocation efficiency, we adopt the methodology developed by Battese and Coelli (1992) and Kumbhakar (2000) to estimate the

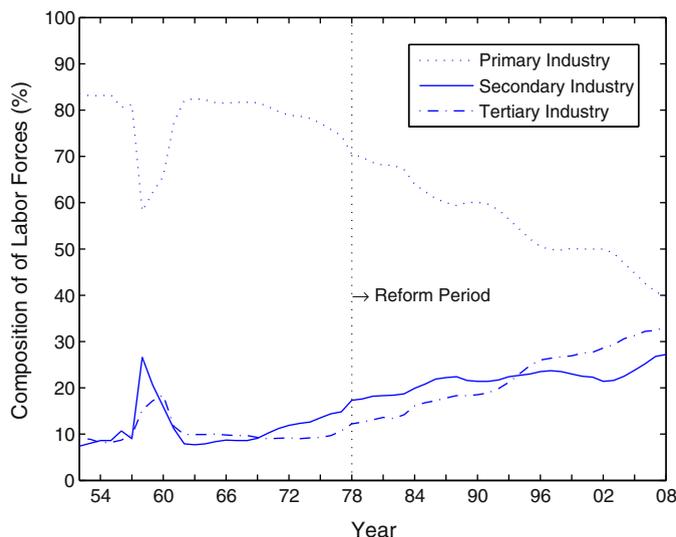


Fig. 1. Composition of labor forces of three strata of industry in China (1952–2008).

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