Productivity growth in Asian manufacturing: the structural bonus hypothesis examined

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Abstract

This paper examines the role of structural change in explaining aggregate productivity growth in the manufacturing sector of four Asian countries over the period 1963–1993. The conventional shift-share analysis is used to measure the impact of shifts in both labour and capital inputs. The results do not support the structural-bonus hypothesis, which states that during industrial development, factor inputs shift to more productive branches. This finding is robust, even when the conventional shift-share analysis is modified to take into account increasing returns to scale as described in Verdoorn's law. It is argued that improvements in productivity levels were widespread and depended negatively on the distance from the global technology frontier, confirming the Gerschenkronian notion of catch-up. © 2000 Elsevier Science B.V. All rights reserved.

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1. Introduction

Processes of modern economic growth and catch up do not merely involve a significant increase in productivity levels, but also entail changes in the distribution of inputs and outputs across sectors. Kuznets stated that 'it is impossible to attain high rates of growth of per capita or per worker product without commensurate

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substantial shifts in the shares of various sectors' (Kuznets, 1979, p. 130). The hypothesis that structural change is an important source of growth and productivity improvement, is a central tenet of the growth-accounting literature (Maddison, 1987) and is derived from classical models of a dual economy (Lewis, 1954). Assuming the existence of surplus labour in some parts of the economy, a shift of labour towards modern industry will be beneficial at the aggregate level, as workers with low productivity will be put to more productive uses. Various studies have shown that this shift has been an extra source of aggregate productivity growth in addition to any sectoral productivity growth in many countries (see Syrquin, 1984, for an overview). The field recently attracted new attention in attempts to explain the East Asian miracle (Lucas, 1993; Young, 1995; Nelson and Pack, 1999).

Most studies focus on the shift from agriculture to manufacturing and have little to say about the importance of shifts within the manufacturing sector. Nevertheless, the industrial development literature suggests that in the course of economic growth, labour and capital shift from less productive manufacturing branches towards more productive branches. As a consequence, aggregate productivity growth in the manufacturing sector will be boosted in addition to any intra-branch growth. We call this the 'structural-bonus hypothesis'. Using data for 13 manufacturing branches, the hypothesis is tested in this paper for four rapid growing Asian countries: India, Indonesia, South Korea and Taiwan for the period from 1963 to 1993. Use is made of the conventional shift-share analysis introduced by Fabricant (1942) to analyse productivity effects from shifts of labour. The method was extended by Massell (1961) to incorporate shifts in labour and capital simultaneously. The shift-share methodology is still a popular tool to decompose aggregate productivity growth (see Paci and Pigliaru (1997) or Fagerberg (1999) for recent applications).

One of the main criticisms of the conventional shift-share analysis is the neglect of increasing returns to scale as described in the Verdoorn Law (Verdoorn, 1949). As stressed by Kaldor (1966), increasing returns include both static returns due to processes of labour division and specialisation in growing sectors and dynamic effects as technical progress is fostered by output growth. Because they feature prominently in many endogenous growth models, the study of increasing returns to scale recently attracted renewed attention (Fingelton and McCombie, 1998; Harris and Lau, 1998). If returns to scale differ across sectors, as argued by Kaldor and inputs shift to the sectors with higher returns, the effects of structural change on productivity growth are bigger than indicated by the conventional shift-share analysis. This paper proposes a modified shift-share analysis which takes into account Verdoorn effects. Using estimates of sector-specific effects, the importance of structural change for aggregate productivity growth can be better assessed. The remainder of the paper is organised as follows.

Section 2 presents arguments in favour of the structural-bonus hypothesis for the manufacturing sector based on the industrial development literature. This is followed by a discussion of the data in Section 3. The shift-share analysis is applied for labour productivity growth in Section 4. Using data on capital stock, we present an analysis of total factor productivity growth in Section 5, which takes into