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# The rise of service employment and its impact on aggregate productivity growth

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## Abstract

This paper investigates how the employment shift from manufacturing toward service sectors affects the rate of economic growth when services play their role both in intermediate and in final demand. Our model includes as a special case both Baumol's [Baumol, W.J., 1967. Macroeconomics of unbalanced growth: the anatomy of urban crisis. American Economic Review 57 (3), 415–426] model, in which services are produced only for final consumption, and Oulton's [Oulton, N., 2001. Must the growth rate decline? Baumol's unbalanced growth revisited. Oxford Economic Papers 53 (4), 605–627] model, in which services are entirely devoted to intermediate demand. We show that, given that the growth rate of productivity in the service sector is lower than that in the manufacturing sector, both the employment share in manufacturing and the rate of economic growth will decline in the long run irrespective of the size of the elasticity of substitution between labor and service input.
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## 1. Introduction

The purpose of this paper is to examine the effect of deindustrialization on economic growth. Following Rowthorn and Wells (1987), we define deindustrialization as a decline in the share of

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Table 1
Employment share (%) for industry, services, and agriculture

| | Industry | | | Services | | | Agriculture |
|---|---|---|---|---|---|---|---|
| | 1950 | 1980 | 2001 | 1950 | 1980 | 2001 | 2001 |
| France | 35 | 36 | 24 | 37 | 55 | 74 | 1.6 |
| Japan | 23 | 35 | 31 | 30 | 54 | 64 | 4.9 |
| UK | 45 | 38 | 25 | 50 | 60 | 73 | 1.4 |
| US | 34 | 31 | 22 | 54 | 66 | 75 | 2.4 |

Source: WDI 2004, Maddison (1995).

employment in industry especially in manufacturing. Since the employment share of agriculture in developed countries is very small, deindustrialization suggests a rise in the share of employment in services. Table 1 shows the share of industrial, service, and agricultural employment in France, Japan, the UK, and the US. The data come from the World Bank, World Development Indicators 2004 (for 1980 and 2001) and Maddison (1995) (for 1950). The share of service employment consistently rises while that of industrial employment declines from 1980 to 2001.

What causes such an employment shift? What effect does it have on economic growth? Baumol (1967) is a pioneer in this field. He classifies economic activity into two sectors: the technologically progressive and technologically stagnant sectors. The former and the latter can be thought of as manufacturing and services, respectively. Then he presents a two-sector growth model and shows the mechanism of deindustrialization.[1] Moreover, he reveals that deindustrialization depresses the rate of economic growth. Baumol has made two important assumptions in his model: (i) the two sectors differ in the growth rate of productivity; (ii) output ratio of the two sectors is kept constant. In Baumol's model, both sectors produce for final consumption and no intermediate input exists, so that the assumption of constant output ratio means constant consumption ratio. Therefore, assumption (ii) concerns the demand side of the model, while assumption (i) is involved in the supply side.

In contrast, Oulton (2001) formalizes a situation where services are used for intermediate demand in manufacturing sector and shows that if the growth rate of productivity in service industry is positive, then the ongoing of deindustrialization does not retard economic growth, rather, it increases the growth up to a certain point. Note that in Oulton's model the final product is only manufacturing and the service is entirely dedicated to intermediate demand. Therefore, the model cannot consider the demand side assumption stressed in Baumol's model.

The present paper investigates how the employment shift from manufacturing toward service sectors affects the rate of economic growth when the services play their role in both intermediate and final consumption, which makes it possible to deal with the assumption of constant consumption ratio in the model.

[1] Rowthorn and Wells (1987) and Rowthorn and Ramaswamy (1997) add an agricultural sector and build a three sector model which is influenced by Baumol's idea. Raiser et al. (2004) extend Rowthorn and Ramaswamy's (1997) model to treat technological spillovers between countries. Using it, they carry out a benchmark analysis of structural change in transition countries such as Central and Eastern Europe and the former Soviet Union, and simulate the path of adjustment from central planning. Notarangelo (1999) argues that Baumol's model can be interpreted as a particular case of Pasinetti's (1993) pure labor production model. She extends Baumol's two-sector growth model so as to incorporate the notion of effective demand. The model is able to capture the interaction between effective demand and technological progress in determining the dynamics of the output and employment.