



ELSEVIER

Available online at www.sciencedirect.com

SCIENCE @ DIRECT®

regional
SCIENCE
& urban
ECONOMICS

Regional Science and Urban Economics 35 (2005) 808–836

www.elsevier.com/locate/econbase

A two-region model with two types of manufacturing technologies and agglomeration

Kazuhiro Yamamoto

Graduate School of Economics, Osaka University, 1-7, Machikaneyama, Toyonaka, Osaka, Japan

Received 4 March 2003; received in revised form 27 September 2004; accepted 20 October 2004

Available online 27 July 2005

Abstract

A two-region model is proposed in this paper. Manufactured goods can be produced with cottage technology under constant returns to scale or with modern technology using differentiated intermediate goods, which are produced with increasing returns to scale technology. In the model, there may be multiple equilibria, and, in such cases, the initial conditions determine the equilibrium that the economy reaches. It is shown that strong increasing returns due to specialization and low transportation costs bring about industrialization with agglomeration. This framework explains the mechanism behind the different industrialization process in Japan and in less developed countries. © 2005 Elsevier B.V. All rights reserved.

JEL classification: O11; O14; R13

Keywords: Agglomeration; Cottage technology; Modern technology; Industrialization process

1. Introduction

This paper presents a development model with two regions. In the model, manufactured goods can be produced with cottage technology under constant returns to scale or with modern technology using differentiated intermediate goods, which are produced with increasing returns to scale technology. The process of transition of manufacturing production from cottage to modern technology is called “industrialization.” Our focus is on the two basic factors of industrialization. One is a high level of increasing returns due to

E-mail address: yamamoto@econ.osaka-u.ac.jp.

0166-0462/\$ - see front matter © 2005 Elsevier B.V. All rights reserved.
doi:10.1016/j.regsciurbeco.2004.10.001

specialization. The other is low transportation costs, which enable technologies with increasing returns to operate. Young (1928) said that the increasing returns due to specialization are the basic component of economic development. A large, geographically clustered population is required to enable a high level of increasing returns due to specialization. Our model suggests that low transportation costs and a high level of increasing returns due to specialization bring about industrialization with agglomeration. In the model, a large market is realized under low transportation costs, which contribute to industrialization.¹

In this framework, the model has four types of potentially realizable stable equilibria: pure cottage technology, symmetric modern technology, intermediate agglomeration, and full agglomeration. In the pure cottage technology equilibrium, all manufactured goods are produced with cottage technology, and the location of the manufacturing workers is symmetric. In the symmetric modern-technology equilibrium, manufactured goods are produced with modern technology in both regions, and the location of manufacturing workers is symmetric. In the intermediate agglomeration equilibrium, manufactured goods are produced with modern technology in one region, while, in another region, they are produced with cottage technology. In this equilibrium, more manufacturing workers locate in the industrialized region than in another region. In the full-agglomeration equilibrium, manufactured goods are produced with modern technology, and all manufacturing activities agglomerate in one region. In some parameter values, the model has multiple equilibria. When the economy has multiple equilibria, initial conditions determine the equilibrium that the economy reaches.²

From a theoretical point of view, our approach is closely related to two existing theories. One is the theory of new economic geography developed by Krugman (1991) and Fujita et al. (1999), and the other is the development theory presented by Murphy et al. (1989) and Matsuyama (1992).

The new economic geography, which developed during the last decade, focuses on the interrelationship between increasing returns to scale and transportation costs. In those models, when the transportation costs are low, the economic activities tend to cluster due to a linkage effect. In existing models of new economic geography, manufactured goods are produced only with the technology of increasing returns to scale.³ In development

¹ Locay (1990) suggested that a large market is necessary for the economy to achieve the division of labor. In his model, there are two technologies that produce manufactured goods: home technology and firm (market) technology. He showed that, if the market is sufficiently large, manufactured goods are produced using firm technology, which naturally has a higher level of increasing returns due to specialization than home technology.

² In many development and geographical models, such as those of Murphy et al. (1989) and Krugman (1991), the initial condition determines the equilibrium that the economy reaches when the economy has multiple equilibria.

³ Puga (1998) and Murata (2004) constructed a new economic geography-type development model. Their model shows that workers switch from the agricultural sector to the manufacturing sector when transportation costs become low. In our models, on the other hand, the production of manufactured goods is possible with both cottage and modern technology. With this framework, we focus on the process of the switch from cottage to modern technology in the manufacturing sector. Thus, our model deals with industrialization that is based on technological change, while Puga (1998) and Murata (2004) describe industrialization that is based on sectoral changes. Of course, both aspects are important in the process of economic development.

متن کامل مقاله

دریافت فوری ←

ISIArticles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات