

Abstract of Doctoral Dissertation

Title: Economic Analysis of Industrialization, Industrial Structure and Industrial Upgrading

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This dissertation investigates the industrialization process (the transformation of economic activities from the primitive production to the industrialized production) with production differentiation in national economies, and industrial structure and industrial upgrading (the transformation of economic activities from low-tech to high-tech production) in regional and urban economies. It consists of the following five chapters.

Chapter 1 explains the backgrounds of industrialization, industrial structure and industrial upgrading in Japan and China, reviews the related economic literature and describes the purpose and organization of this dissertation.

Chapter 2 revisits the industrialization model of Murphy et al. (1989) (MSV) to illustrate their main points. That is, once the first industrializing sector has a positive profit, due to the existence of aggregate demand spillovers, the profits of industrialization will increase with the industrialization level, leading to a self-sustaining industrialization process. It then takes the production differentiation analysis into consideration using the Dixit-Stiglitz (1977) monopolistic competition framework. It shows that with high product substitutability, industrializing sectors would cut their prices and steal the sales from their competitors, leading to a business-stealing effect. Moreover, if this business-stealing effect dominates the aggregate demand spillovers, the profits of industrializing monopolists will decline with the industrialization level, and the industrialization process will not be necessarily self-sustaining, which suggests two neglected industrialization patterns: partial industrialization and ruinous competition. Therefore, in addition to the increase of aggregate demand as illustrated in MSV, the increase of product differentiation through innovation and research and development (R&D) is also critical in the stimulation of industrialization.

Chapter 3 shifts the view from industrialization in national economies to regional industrial structures. Krugman's new economic geography (NEG) model (1991) made a symmetric assumption on the production of variety goods, and the majority of NEG studies aggregated the production activities (excluding agriculture) into one kind of the variety goods, failing to model the characteristics of different manufacturing activities. They always assumed an exogenous

interregional productivity gap, which determines regional comparative advantage and industrial structures, without explaining how the productivity gap was formed. Chapter 3 extends Krugman's original model to a two-industry and two-factor case where the manufacturing activities are classified into intermediate input-intensive (high-tech) industries and labor-intensive (low-tech) industries as done in Matsuyama (1996). Then, it shows that the region with more fixed capital has an absolute advantage in the two manufacturing industries and a comparative advantage in the capital-intensified (high-tech) industry. This leads to such regional manufacturing structures that the capital-abundant region has larger revenues of the two manufacturing industries (reflecting the absolute advantage) and a larger revenue ratio of the high-tech to low-tech industries (reflecting the comparative advantage). These theoretical inferences are supported using evidence from the data on the regional industrial structures in China. So, to upgrade a region's industrial structure, it is important to strengthen the local fixed capital stock so as to attract more and more high-tech industries to agglomerate to the region.

Chapter 4 investigates the industrial upgrading in urban economies by extending Henderson's model (1974) of urban system into a two-industry case of urban system with inter-urban trade to investigate the relationship between urban agglomeration and industrial upgrading. Since the major channels of agglomeration economies are labor pooling, knowledge spillovers, and sharing the specialized local services, urban areas will have comparative advantage and relatively specialize in such production activities that are intensive in skilled labor, scientific research and education, and information and communications. Chapter 4 develops an industrial stage index to reflect industries' input intensities in high-tech activities (skilled labor, scientific research and education and information and communications), and then uses this index with cities' industrial employment composition to form an urban industrial stage index for cities, which reflects their intensities in high-tech activities. The relationship between urban agglomeration (reflected by total employment or employment density) and urban industrial upgrading (reflected by the urban industrial stage index) is verified using city-level panel data from Japan's economic census. The result implies that to keep the industrial upgrading in cities, it is needed to encourage population to agglomerate in large cities and centralize the population.

Chapter 5 concludes this dissertation and suggests some subjects for future research.

In short, this dissertation clarifies the role of product differentiation in the industrialization process in national economies, and analyzes industrial structure and industrial upgrading in regional and urban economies. It illustrates that (a) the increase of product differentiation stimulates industrialization, (b) the increase of local fixed capital stock raises the level of regional industrial structure, and (c) urban agglomeration is positively associated with urban industrial upgrading.