

論文の内容の要旨

論文題目 Essays in Empirical Urban Economics

(実証都市経済学に関する研究)

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People and economic activities are not equally distributed with respect to space. People often agglomerate in cities and this tendency is intensified in the global setting. The percentage of the world's population living in urban areas has been steadily increasing from 29.6% in 1950 to 53.9% in 2015 (United Nations, Department of Economic and Social Affairs, 2018). This figure is projected to reach 68.4% in 2050, indicating that more than two-thirds of the world's population will be living in urban areas within the next few decades. The number of megacities, that is, cities with more than 10 million inhabitants, has also doubled over the decades. Alongside this uneven distribution among cities, people and economic activities are not uniformly distributed even within cities. Cities often consist of specialized areas such as business, commercial, or residential districts. In residential districts, specific types of inhabitants often choose to locate within a certain area depending on their income level or race.

Urbanization has been promoting economic growth through an increase in productivity and innovation. However, over-agglomeration causes congestion, poor living environments, and inadequate infrastructure. The concentration of specific types of people in cities can be beneficial because they can gain access to their networks (Bayer et al., 2008) and avoid negative neighborhood externalities. However, this unequal distribution also carries the risk of lousy segregation, which result in unequal job opportunities and amenities (Cutler et al., 2008).

What determines the spatial distribution of people and economic activities? To achieve optimal and sustainable spatial distribution via policy implementation, it is important to understand the determinants of existing distribution structures. This dissertation consists of three chapters. Each chapter individually focuses on one of three mechanisms that determine spatial distribution, as discussed in the literature: (1) change in production technology, (2) change in transportation costs, and (3) neighborhood externalities. Chapters 1 and 2 examine whether and how changes in production technology and transportation costs, respectively, alter the geographic distribution. Chapter 3 examines whether the externality effect truly exists.

Chapter 1 focuses on the change in production technology. Technological change, which is often represented as a shift in the production function, is one of the leading forces of economic growth. Many studies have addressed factor-neutral technological change—represented by the change in the total factor productivity (Solow, 1957)—which increases productivity but does not alter the proportion of production factors. In the last few decades, increasing wage inequality among skills has drawn attention to factor-biased technological change, such as skill-biased technological change (SBTC) (Violante, 2008). Under this change, some production factors (for example, skilled workers in SBTC) benefit more, but others (for example, unskilled workers in SBTC) do not. While technological change is identical in all regions, the impacts of the change can differ among regions depending on the regional factor endowment. Technological change will alter the spatial distribution of economic activities, which has been confirmed theoretically (Autor and Dorn, 2013; Accetturo et al., 2014; Tabuchi et al., 2018). Empirical studies also show that cities' or countries' skill endowments shape their economic growth or total factor productivity growth (Berman, 2000; Berger and Frey, 2016). This chapter focuses on a recent technological change—job process automation. It mainly affects labor productivity and can be classified as SBTC. By focusing

on workers' migration decisions, this chapter examines the direct effect of the technological change on spatial distribution.

Chapter 2 conducts empirical analyses to examine the effect of new transportation infrastructures, especially the high-speed rail in Kyushu, Japan. This chapter focuses on the change in transportation costs. Unless the economy is self-sufficient, every area is connected with other areas. Firms transport inputs and outputs of production, and people themselves visit markets in other areas. Transportation infrastructures that reduce freight and passenger transportation costs are perceived as one of the main drivers of economic growth. Previous literature has mainly compared the effects of new transportation infrastructures on areas with and without the infrastructures, and many of these studies have found positive impacts on the local economy.¹ As this chapter discusses, transportation even reshapes the spatial distribution within connected areas. This phenomenon is well analyzed theoretically in New Economic Geography, pioneered by Krugman (1991), in which transportation costs are vital to determine the spatial distribution of activities. It shows that people agglomerate into one city when the transportation costs sufficiently decline. Although there are many empirical studies on transportation, this effect among connected areas has not been intensively studied with data.

The previous two chapters mainly focus on determinants of the spatial distribution of economic activities across cities. Chapter 3 focuses on neighborhood externalities as the main determinant of the distribution within a city. "Externalities arise when an agent does not compensate others for the effect of his actions (Kanemoto, 1980)." In a city where people agglomerate, there are a variety of externalities such as knowledge spillovers, traffic congestion, and pollution. This chapter primarily focuses on neighborhood externalities, which are externalities among different groups of people. The most typical ones are externalities between the rich and the poor and externalities among different races. Several studies have reported that neighborhood externalities determine the spatial distribution of different types of people (Kanemoto, 1980; Fujita, 1989). This chapter addresses a new type of neighborhood externalities in the literature, the "neighborhood externalities of one-room residents," and estimates whether the externalities actually exist. It enables us to discuss whether the externalities could be one of the determinants of the spatial distribution of people in a city.

The following provides the detailed summaries of each chapter.

Chapter 1: The effect of automation levels on US interstate migration²

This chapter investigates the extent to which job process automation, which has resulted in wage inequality and job polarization in the United States, has affected interstate migration over the past two decades. The level of automation in each state is calculated using data on the degree of automation of each occupation. In particular, this study examines how the difference in the levels among states explains the movement of migrants. The results show that people move to states with more automation in skilled occupations and less automation in unskilled occupations. This finding implies that automation has a complementary (substitution) effect on skilled (unskilled) occupations. The results also show that the former effect is larger and more robust than the latter one. Further analyses use migration flow data classified into several subgroups and find that both skilled and unskilled workers in most occupations move to states with more automation in skilled occupations and less automation in unskilled occupations.

¹Section 2.2 summarizes the literature.

²This chapter is based on following paper: Okamoto, Chigusa (2019) "The effect of automation levels on US interstate migration," *The Annals of Regional Science*, Vol.63, Issue 3, pp.519–539.

Chapter 2: Impacts of high-speed rail constructions on urban agglomeration: Evidence from Kyushu in Japan³

High-speed rail integrates urban and regional economies, and thus can possibly have significant impacts on the distribution of economic activities. Using the opening and extensions of a high-speed rail, Shinkansen, in Kyushu, Japan, we examine its effects on the distribution of economic activities across urban agglomerations. We focus on changes in land prices and estimate hedonic price equations to conduct a difference-in-differences analysis. We find that the large metropolitan areas gained from the high-speed rail by experiencing increases in land prices, whereas small metropolitan areas located between them lost by experiencing decreased land prices. However, such positive effects are shown to be limited to areas close to Shinkansen stations.

Chapter 3: Neighborhood externalities from “one-room apartments”

This study focuses on a new type of neighborhood externalities discussed in the literature—those from “one-room apartments,” a term commonly used in Japan to refer to studio apartments. There is growing concern over the externalities caused by their occupants, and several municipalities in Japan have regulated the construction of new one-room apartments. This study examines whether negative externalities of one-room units toward non-one-room units exist by estimating the hedonic price equations with a rich dataset of rentals in Tokyo’s 23 wards. We find clear evidence of negative neighborhood externalities both within apartments and within districts. This study addresses the externalities within a building, which are the most micro-level neighborhood externalities in the literature.

³This chapter is a joint work with Yasuhiro Sato. This chapter is a revised version of following paper: Okamoto, Chigusa and Yasuhiro Sato (2018) “Impacts of high-speed rail construction on urban agglomerations: Evidence from Kyushu in Japan,” CIRJE Discussion Paper Series, CIRJE-F-1097, University of Tokyo.

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