

Chapter 1

Introduction and Summary

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1.1 Introduction

Countries or regions playing leading roles worldwide have traded places many times during human history. Countries or regions such as Greece and the Roman Empire, facing the Mediterranean Sea, played leading roles on the front stage of the history in ancient times. Moreover, Spain or Portugal held center stage during the Age of Geographical Discovery. European countries, including Spain and Portugal, made inroads into Asian countries and South America to obtain spices such as pepper and mineral resources such as gold and silver in the fifteenth century. Although the thrust of European countries at the beginning of the Age of Geographical Discovery was trade among non-European countries, European countries colonized those countries. Eventually, Spain and Portugal fell to ruin after that the Spanish Armada was defeated by the large English Royal Navy in 1588. The United Kingdom reigned over the world economy after the rise of the Industrial Revolution in eighteenth century. The U.K. promoted industrialization earlier than other countries and overcame competition with other countries. In fact, the U.K. was the center of the world economy during the eighteenth and nineteenth centuries. Eventually, because its many colonies in Asia and Africa became independent after the two World Wars of the twentieth century, the U.K. lost its capability of sustaining economic growth despite being a victorious country. Moreover, most European countries had been battlefields of World War II. Industries of many kinds were crushed by war and destruction of various kinds. Consequently, their productivity plummeted, requiring time and effort to restore it to pre-war levels.

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T. Naito (ed.), *Sustainable Growth and Development in a Regional Economy*,
New Frontiers in Regional Science: Asian Perspectives 13,
DOI 10.1007/978-4-431-55294-9_1

As for the United States, the sudden fall of stock prices on the New York exchange signalled the world financial crisis of 1929. The ensuing Great Depression in the United States spread globally. This recession affected the economic policies most countries and exacerbated the origins of World War II. For example, the U.K. and France organized a bloc economy by setting high tariffs or by making trade agreements to save their own economies. Germany and Italy chose fascism because both countries had lost all of their colonies after World War I and had borne a large amount of indemnification through provisions of the Treaty of Versailles. Consequently, their behaviors might be seen as triggers of World War II. As described above, most European countries sustained severe economic damage irrespective of whether they had been victorious or defeated. In stark contrast, the United States was not a main battlefield. Its productivity was not degraded in the least because of World War II. In fact, the United States took its place at the center of the world economy, replacing the U.K. after World War II. Although the United States and capitalist countries competed with socialistic countries such as the Union of Soviet Socialist Republics, most socialistic countries failed to control their respective economies, and ground to a halt by the end of the twentieth century. Nobody can doubt that the United States anchored the world economy after World War II and has pulled the world economy forward consistently through the latter twentieth century. Although the United States has worked through severe trade deficits and budget deficits, it has remained at the top position of the world economy. In fact, GDP in the United States was about 6,724 billion dollars in 2013, which is the highest worldwide. Nevertheless, other countries have been in hot pursuit of the U.S economic dominance through rapid economic growth since the *Bankruptcy of Lehman Brothers* that occurred in 2009.

Recently Asian countries have experienced rapid economic growth. Japan was the only Asian country to have established industrialization before World War II. Although Japan had among the poorest countries in the nineteenth century, Japan succeeded in catching up to other developed countries, such as those in Europe, or the United States, because it had acquired interests in eastern Asia and the Pacific Ocean through victories in the Russo–Japanese War and World War I. However, Japan lost all overseas interests from its defeat during and after World War II. Thereafter, the Japanese economy revived itself through the emergency demands of the Korean War, achieving an economic growth rate higher than 10% from the 1950s until the oil shock in 1973. Although the progress of the Japanese economy was halted by the oil crisis in 1973 once, stable growth continued after the oil crisis. The glory days of the Japanese economy ended suddenly in 1991. Although the Japanese economy had achieved growth again in the 1980s, the bubble economy in Japan burst in the 1990s. It has taken more than 20 years for the Japanese economy to recover.

As Asian countries aside from Japan gained independence following World War II, they have developed their respective economies. The NIES countries including Korea, Taiwan, Hong Kong, and Singapore attracted worldwide attention during the 1970s. ASEAN countries such as Malaysia, Thailand, Indonesia, and the Philippines achieved rapid economic growth during the 1980s. China introduced

market mechanisms to Chinese economy in the 1980s, although political systems in China have been maintained. The Chinese economy emerged even more strongly in 2000s, when its GDP in China overtook that of Japan, making it the second largest economy in the world. Although China has played the role of the world's factory, it has become an extremely important country in the world economy because it has a huge market with more than one billion population. Although each country's economy has undergone a transition through history, it is expected that Asian countries will serve an even more important role in the global economy.

Economic growth has brought wealth to us and has improved human society. However, it has brought not only benefits but also costs to us. Humanity cannot be blind to the negative aspects brought by economic growth to achieve sustainable economic growth. Humanity has made sacrifices in exchange for economic growth. Using fossil fuels has dramatically improved industrial productivity, but has caused severe environmental issues such as air pollution, global warming, and acid rain. For instance, population growth has brought benefits as a population bonus. However, agglomeration of population to a particular region or city has led to the generation of a dualistic economy and has brought differential and urban unemployment. Economically developed countries must show resolve to tackle urgent issues related to aging population and low birth rates to sustain social security systems. In economically developing countries, population growth presents numerous social issues that must be addressed. Asian country populations, which are markedly larger than those in other regions, must achieve economic growth based on the recognition of these disadvantages.

Considering this economic backdrop, we can provide prescriptions for readers to pursue sustainable economic growth in the region. This book comprises two parts. Part I presents a basic model required to analyze the issues of economic growth and regions. Applied economic models in Part II are based on models of this part. We overview basic models to analyze economic growth, spatial economy, social security, transportation network, and the environment. In Part II, we assess prescriptions for a sustainable economy by analyzing the applied model. It is necessary to elucidate the population, urbanization, and other matters in particular countries to consider sustainable economic growth in each countries. We construct an economic model and analyze it with the Asian economy in mind. Therefore, we refer to population, urbanization, agglomeration of Asian countries in the next section.

1.1.1 Population in Asian Countries

This section presents an overview of population, urbanization, agglomeration, and environment in Asian countries. First, we refer to a transition of population in Asian countries. Most Asian countries became independent of their respective suzerains during the 1950s–1970s. After gaining independence, their populations uniformly increased. The populations of Asian countries were about 1,400 million in 1950.

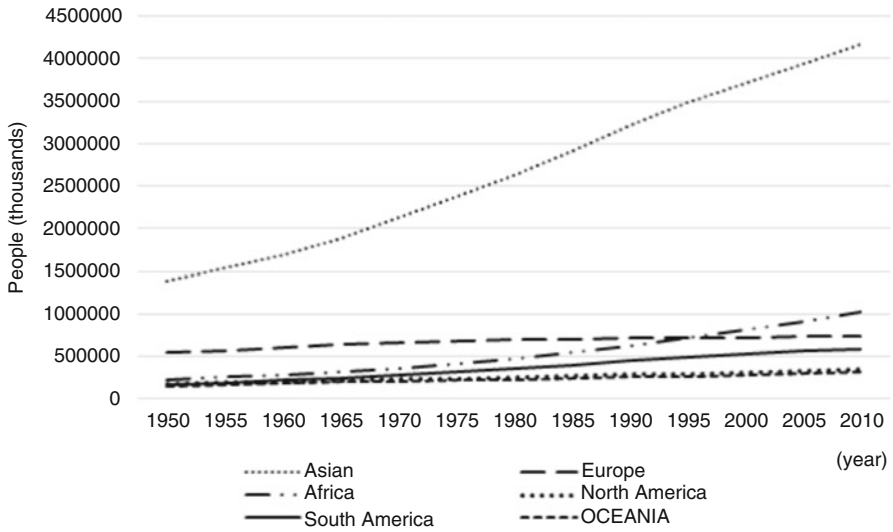


Fig. 1.1 Population in Asia and other areas (Source: UN World Urbanization Prospects: 2014 Revision)

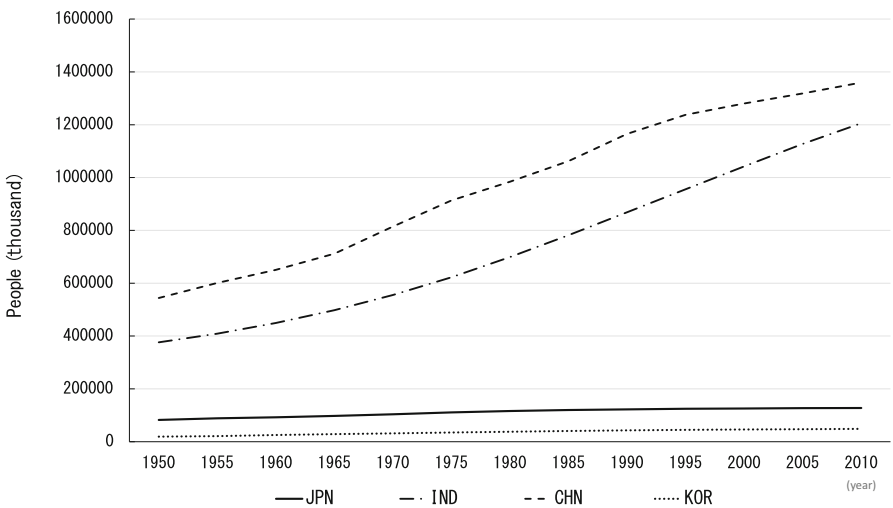


Fig. 1.2 Population growth in major Asian countries (Source: UN World Urbanization Prospects: The 2014 Revision)

However, they increased to about 4,165 million in 2010. Figure 1.1 shows the population in each region during 1950–2010. As Fig. 1.1 shows, population growth in Asia is higher than in other areas except for Asia. From Fig. 1.1, it is apparent that the population in Asia is increasing. However, the degree of population growth differs among countries. Figure 1.2 presents the transition of population growth of

China, India, Korea, and Japan. As Fig. 1.2 shows, the populations in Japan and Korea have not increased rapidly, although that in China and India continues to increase. According to Statistics Korea and the Japan Statistics Bureau, the fertility of Korea in 2013 was 1.19. That of Japan was 1.43. Now both countries confront severe issues with the declining birth rate. However, population growth in China and India has increased since 1950. Generally speaking, the rate of population in developing countries is higher than that in developed countries.

1.1.2 Urbanization in Asian Countries

Urbanization often affects human society, economy, environment, and so on, irrespective of whether it occurs in an economically developed country or developing country. In the general population, it tends to produce agglomeration in particular cities or regions as the economy in each country shows growth. Presuming that we define the ratio of urban population to the total population as urbanization rate, the urbanization rates of Asia were 16.8 % in 1950, that rate increases to 41.8 % in 2010. It is about 2.5 times the rate in 1950. Considering that the urbanization rate of each region except for Asia is about 75 %, it is possible that the urbanization rate in Asia will increase this percentage.

Next we consider the transition of urbanization rates in major countries. Figure 1.3 depicts the urbanization rate transition in 1950, 1970, 1990, and 2010. In

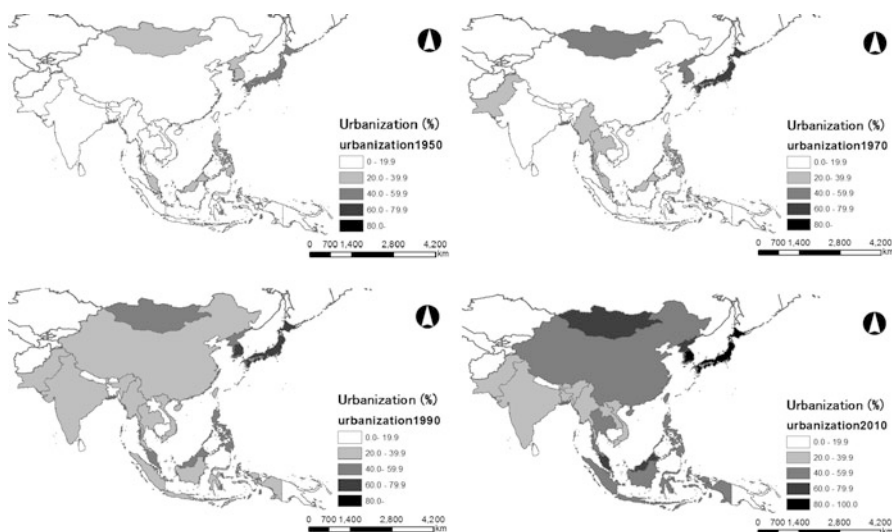


Fig. 1.3 Urbanization trends in Asia during 1950–2010 (Source: UN World Urbanization Prospects: The 2014 Revision)

1950, countries in which urbanization rate was higher than 50 %, are Japan, Korea, and city states such as Hong Kong, and Singapore. However, the urbanization rates of Vietnam, Laos, Cambodia, and Thailand are low. The only countries in eastern Asia and Southeast Asia where urbanization rates were lower than 20 % were Bhutan and Nepal in 2010.

1.1.3 Agglomeration in Asian Countries

In a previous section, we explained how urbanization extends itself in Asian countries. However, we do not show why population agglomerates in particular cities or regions using economic theory. Agglomeration of population in particular cities or regions does not occur randomly. Traditional international economics theory has been based on assumptions of constant returns of scale and no transportation costs of goods or input factors such as labor and capital. Although traditional international economics has addressed trade between countries, spatial factors have been ignored.

Krugman [5] and Fujita, Krugman, and Venables [3] constructed what is known as the new economic theory by combining traditional trade theory with economic geography. They consider the issue of why industries agglomerate in particular places. Spatial economics, on which some models in this book are based, plays an important role in resolving how spatial structures are determined endogenously and how some industry resources and facilities are allocated geographically. Spatial economics take account of product differentiation, increasing returns to scale, and transportation costs, in addition to traditional trade theory.

1.1.4 Environments in Asian Countries

Economic development has occurred at the expense of damage to the environment. Global warming has become a severe problem worldwide. It must be addressed immediately and intensively. Although European countries advanced the Industrial Revolution using fossil fuels, the use of fossil fuels has caused severe environmental problems such as acid rain and air pollution in these countries. Asian countries and European countries have also degraded the environments in many ways through economic development. Figure 1.4 describes CO₂ emissions in Asian countries. As Fig. 1.4 shows, CO₂ emissions in most Asian countries increased during 1980–2010.¹ During the twenty-first century, China and India stand to establish the most remarkable economic development among Asian countries. When we analyze the

¹CO₂ emissions in Fig. 1.4 are not emissions per capita but gross emissions.

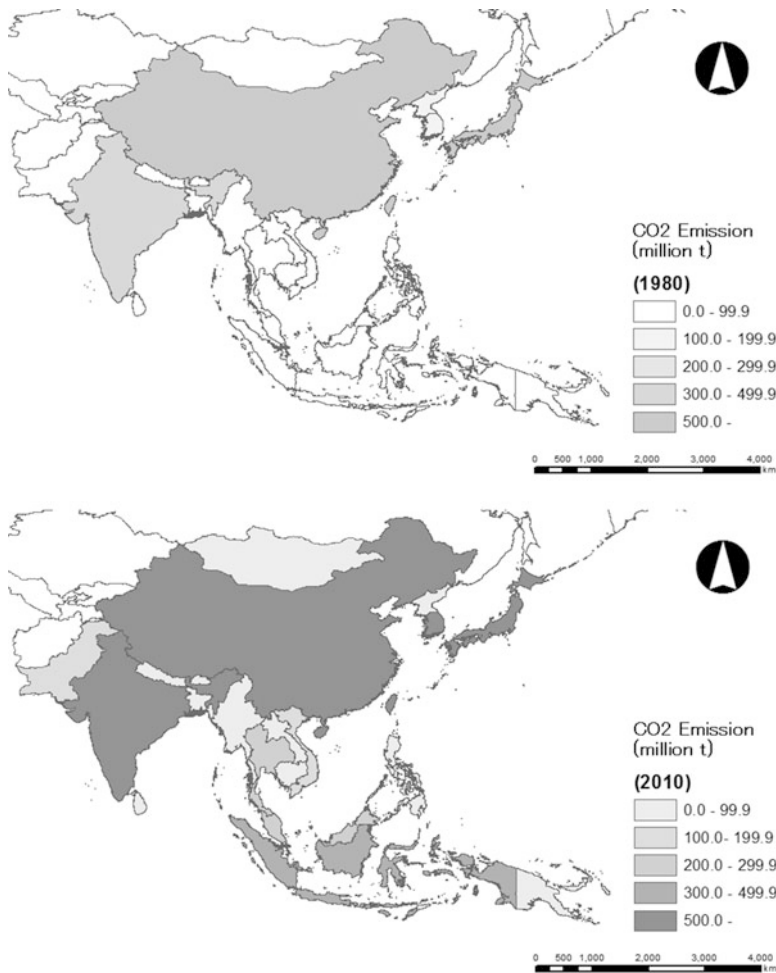


Fig. 1.4 CO₂ emissions in Asian countries (Source: The World Bank 2014)

environment, scrupulous attention must be devoted to analysis of their effects. For instance, recent emphasis on air pollution has shown that the PM_{2.5} issue has affected not only China domestically, but also eastern Asian countries. The PM_{2.5} particulates are created by the combustion of fossil fuels. They are harmful to human health. It is difficult to resolve this environmental issue because only environmental policies of a particular country establish an optimal situation. Some environmental regulations might stall economic growth. Therefore, the regulatory authorities must take account of the effects of environmental regulation on economic activities. When analyzing the environment, it is necessary to devote scrupulous attention to its analysis because environmental problems include specific properties

in economic analysis, i.e., externality, transboundary pollution, free rider problems, and so on. To achieve a sustainable economy, it is impossible to ignore the attendant environmental problems. Therefore, we address some models including environmental factors in some chapters of this book.

1.1.5 Transportation in Asian Countries

We have already described the urbanization in Asian countries that has progressed since the end of World War II. Although the diversity of goods and economies of scale have had major impacts on regional agglomeration, decreasing transportation costs play an important role in economic development. Decreasing transportation costs facilitate movement of people and goods between regions. In fact, economic borders in Europe have disappeared because of decreasing transportation costs. Recently, the intensity of competition among transportation firms has been rising in Asian countries. That competition has decreased transportation fares. Particularly, airline markets in Asia are extremely competitive because some low-cost carriers (LCCs) have entered airline markets in Asia. Airlines constitute a distinctive industry with the transportation domain. The industrial structure of the airline industry in the United States has changed through deregulation. One reason is mergers. Another is a new network called a hub–spoke network system. Each company performs restructuring of operating routes, setting a specific airport as a hub, with radially organized feeder routes to increase load factors. Airlines in Asian countries have reconstructed their own operating routes by setting hub airports, which include Narita, Singapore, Incheon, Peking, Shanghai, Bangkok, and Hong Kong. Recently, some LCCs have entered international and domestic airline markets. Consequently, incumbent airlines must consider the routing and airfare of these carriers for network operations. Although transportation costs are often given exogenously as a parameter in spatial economics or international economics, transportation costs (fares) are determined endogenously by the transportation industry behavior. Moreover, they depend on relations among regions. Transportation costs are crucially important to determine the strategies of industries in respective countries. Therefore, it is necessary to consider this transportation network carefully. We devote more attention to behaviors of these transport sectors in several chapters of this book.

1.2 Summary in This Book

This book is composed of two parts. One of them is the part of basic theories to analyze sustainable growth of regional economy. Particularly, we show the basic model of some categories, which are spatial economics, development economics,

endogenous economic growth theory, environmental economics, and network economics. Part I plays a role to introduce readers the benchmark models of advanced models to be developed in Part II.

1.2.1 Part I

In Chap. 2, we overview the basic model of spatial economy. Spatial economics is developed by taking account of a distance to be one of most important factors in space, which has been ignored in traditional trade theory. Krugman [5] or Fujita, Krugman, and Venables [3] introduced increasing returns of scale, transportation cost, into love of variety into the models, and explained regional agglomeration endogenously. Moreover, Ottaviano, Tabuchi, and Thisse [8] constructed the model to be solvable analytically. Therefore, we show this model as basic spatial model in this chapter.

In Chap. 3, we overview the basic dualistic economy model. Although a dualistic economy in developing countries have been a serious problem since the end of World War II, Lewis [6] paid his attention to the issues of dualistic economy for the first time. Since Lewis [6] assume that an unlimited labor supply is available at subsistence wage, he does not describe a mechanism to occur urban unemployment. However, Lewis [6] did not describe urban unemployment occurred in the world's developing countries at that time. On the other hand, Harris and Todaro [4] succeed to explain a mechanism by which urban unemployment occurred endogenously in the framework of a dualistic economy. Therefore, we overview Harris and Todaro [4] as the basic dualistic economy model in this chapter. This basic dualistic economy model is applied in Chaps. 9 and 14.

In Chap. 4, we discussed long run growth based on neoclassical growth model. The long-run growth rate is shown the growth rate of population and/or the technological progress. If we assume that productivity increases at an exogenously given rate, say g , the long-run growth rates become positive and we can ward off zero growth. However, we cannot explain how and why technology always improves at the rate, g . Moreover, we discuss the overlapping generations model to examine the intergenerational issues. In the overlapping generations model, introducing individual saving behavior into the model with multiple generations, we can discuss the economic behavior at each period explicitly.

In Chap. 5, we explain the mechanism of productivity improvement endogenously in the model. This model is called as endogenous growth model. We discuss a simple endogenous growth theory based on the Diamond's [2] OLG model. The output of final goods depends on capital, labor and productivity. We assume that knowledge stock accumulates and productivity increases if some resources are devoted to the research sector. That is, we assume that productivity increase is induced by the R&D activities. The economy increases total factor productivity

(TFP) if research activities are carried out appropriately, It is shown that the economy can grow perpetually if the improved TFP can avoid the diminishing returns in the long-run.

In Chap. 6 we consider the timing of emission tax policy. Emission tax timing affects the market outcome and the environment. Chapter 6 examines emission tax policy in the monopoly market in a setting where the regulator has precommitment ability/inability for an emission tax. Furthermore, in the presence (absence) of such precommitment abilities, we explore the effects on monopolist's environmental R&D behavior, emission level, and social welfare. In this chapter, we first explain time-consistent emission tax policy for a monopolist, and also demonstrated that a negative emission tax (i.e., emission subsidy) can be partially justified. Second, these analyzes reveal the existence of the emission-reducing effect in the monopoly market. Furthermore, this chapter investigates whether the government's precommitment to an emission tax promotes the monopolist's environmental R&D and enhances social welfare. The analytical framework in chapter will be extended to a differentiated Cournot duopoly model in Chap. 13.

In Chap. 7, we present the basic model of wastes market. Recently the lack of final wastes incinerators owned by local governments has been afraid due to the increase of wastes in the future in Japan. For achievement of sustainable economic society, it is very important to reform the economic system of mass production, mass consumption and mass disposal, and to establish a resource recycling society. Needless to say, if waste is properly processed, serious environmental problems do not occur. However, there are many illegal processing such as illegal dumping in reality. It is necessary to analyze the behavior of waste disposal logically in order to reduce such an illegal waste disposal. In this chapter, we construct the model to describe waste disposal behavior. Moreover, this model will be applied in Chap. 14 of Part II.

In Chap. 8, we introduce a model to analyze not only the airline network formation problem but also the hub location problem by using a theory of industrial organization. This chapter first derives a carrier's strategies (i.e., related to airfare and flight frequency) to maximize profit and the profit amount. Then, we analyze whether a monopolistic carrier chooses a point-to-point network or a hub-spoke network with one hub airport, and analyze what airport becomes the hub. Additionally, we derive the socially preferable network formation and socially preferable hub location. The main results obtained in this chapter are as follows. When the additional travel time cost for connecting passengers is large (small), the monopolistic carrier adopts the point-to-point (hub-spoke) network. With regard to the hub location problem, the monopolistic carrier does not always choose the hub airport to minimize the potential number of connecting passengers. Additionally, the socially preferable hub airport is not always the airport that minimizes the potential number of connecting passengers. The basic model in this chapter will be applied in Chap. 10.

1.2.2 Part II

Chapter 9 extend the basic dualistic economy by combining it with mixed monopolistic competition model. Recently, most of public firms have privatized regardless of developing countries or developed countries. In fact, governments need pay close attention to public firm's privatization because it affects industrial structure, employment, and so on. Mixed oligopoly is the situation, in which a public firm competes with private firms in the common market. A public firm determines his behavior to maximize the social welfare though private firms pursue their profit under mixed oligopoly. Many studies have been accumulated in Industrial Organization. For instance, De Fraja and Delbono [1] compare a mixed oligopoly in which a public firm is full nationalized, with the pure oligopoly. Moreover, Matsumura [7] considers a model in which the public firm maximizes the weighted average of social welfare and profit as the objective function and shows that the partial privatization of public firm is optimal. However, there are a few studies to associate this mixed oligopoly model with spatial economic or development economics. In this chapter we synthesize this mixed oligopoly and dualistic economy model, and analyze the effect of public firm's privatization on urban unemployment rate or social welfare.

Chapter 10 addresses both the incumbent's and entrant's operating route. We assume that three markets exists and that the potential number of one market is smaller than that of the other market. Considering this situation, Chap. 10 demonstrates following. The subgame perfect Nash equilibrium with regard to the entry route decision is described below. When the difference in the potential number of passengers between two markets is not small, the incumbent carrier (or the major carrier) enters a route that has a smaller potential number of passengers and the entrant carrier (or the regional carrier) enters a route that has a greater potential number of passengers. However, when this difference is small, both the major carrier and the regional carrier enter the route that has a smaller potential number of passengers.

Chapter 11 presents a simple overlapping generations model with political corruption and technological progress to consider problems related to sustainable growth. The dynamic behavior of the economy resembles that of the neoclassical growth model if productivity of the R & D sector is low and political power of capital owners who would like to preserve their own vested interests is strong: long-run growth rate becomes 0. However, the per-capita growth rate becomes positive if productivity of the R & D sector is high and political power of the capital owner is weak. We consider the case in which interest groups make a political donation to prevent a government from introducing taxes that increase the future productivity but sacrifice today's consumption. The government accepts political contributions and sets back the introduction of taxes if the benefit of such contributions is high. The economy might stagnate in the long run even if it has the capability of achieving sustainable growth if so. Therefore, an uncorrupted government becomes an important determinant of sustainable growth.

Chapter 12 considers the fertility. Many developed countries face the fertility declining and governments try to recovery it. To do that, governments give parents the incentive to have more children. Among others, the factors not to have children are the raising cost for children, the education cost, the opportunity cost which parents cannot receive the income during the raising and the saving after retirement. On the first part of this chapter, when governments provide public support for children (In-kind) and public subsidy for children (Cash), the effects of such policies on fertility and social security are examined. Allocation changing from public subsidy to public support at the constant tax rate enhances the fertility but decreases the economic growth rate. Additionally, when the effects of decreasing public subsidy on consumption are equal to that of increasing public support for children on fertility, social welfare is maximized in this model.

On the second part of this chapter, introducing a fertility decision and child care cost into an overlapping generations model with public education and social security, we examine the effects of these public policies on fertility. We show that an increase in income tax, which finances social security benefits and public investment in education, increases fertility. On the other hand, with a constant tax rate, a change in the allocation from social security benefits to public investment in education decreases fertility and, with a constant social security tax, the effect of education tax on fertility is neutral.

Chapter 13 extends a time-consistent emission tax model examined in Chap. 6. This chapter presents examination of a differentiated Cournot duopoly model in a setting in which the government has no precommitment ability for an emissions tax. Furthermore, under the assumption of end-of-pipe technology and no R&D spillover effect, we provide a welfare comparison between two R&D regimes: environmental R&D competition and environmental R&D cartelization. Results show the following facts. First, when environmental damage is slight, and the degree of product differentiation is large enough, environmental R&D cartelization is socially more preferable. In contrast, when environmental damage is severe, and the degree of product differentiation is small enough, environmental R&D competition is socially more preferred. Second, both firms have always some incentives for R&D cartelization. Third, negative emission tax (i.e., emission subsidy) might be partially justified, if environmental damage is slight sufficiently. Moreover, Chap. 13 proves the regulatory environment in which a time-consistent emission subsidy can reduce total emissions more than the case of *laissez-faire*. Finally, policy implications derived from results of theoretical investigations in Chap. 13 are considered. At the same time, weak points of Japanese competition policy are discussed.

Chapter 14 presents the recycling activities and unemployment in economically developing countries by applying the Chaps. 3 and 7. Harris and Todaro [4] reported that fixed wage levels that are higher in urban areas than in rural areas might cause migration from rural areas to urban areas and increase unemployment in urban areas. We consider how a subsidy policy for a recycling sector and informal sectors in urban areas affect disposal and recycling of waste and unemployment in economically developing countries using the Harris and Todaro model, which incorporates recycling activities undertaken by the recycling sector and informal

sectors. Results clarified that increasing the subsidy rate for the recycling sector can engender a decrease in the number of unemployed people, increasing the demand for labor in manufacturing and recycling sectors, which set higher wages, increasing the indirect utility levels and improving social welfare if marginal productivity in the agriculture sector is sufficiently high. Results show that increasing supporting funds for the informal sector might worsen social welfare and increase the unemployment rate, although it increases the expected wages of workers in informal sectors. Moreover, we consider the policies of economically developing countries and the support of economically developed countries through a comparison of outcomes obtained when the landfill is located in an urban area and when it is located in a rural area. Results clarified that the labor demand for the final goods sector and the waste collection sector in the case in which a landfill in an urban area is greater than that in the case in which a landfill exists in a rural area, although the labor demand for the intermediate goods sector shows an opposite relation.

References

1. De Fraja, G., & Delbono, F. (1990). Game theoretic models of mixed oligopoly. *Journal of Economic Surveys*, 4(1), 1–17.
2. Diamond, P. A. (1965). National debt in a neoclassical growth model. *American Economic Review*, 55(5), 1126–1150.
3. Fujita, M., Krugman, P. R., & Venables, A. J. (1999). *The spatial economy: Cities, regions, and international trade*. Cambridge: MIT.
4. Harris, J. R., & Todaro, M. P. (1970). Migration, unemployment and development: A two-sector analysis. *American Economic Review*, 60(1), 126–142.
5. Krugman, P. R. (1991). Increasing returns and economic geography. *Journal of Political Economy*, 99(3), 483–499.
6. Lewis, W. A. (1954). Economic development with unlimited supplies of labour. *The Manchester School*, 22(2), 139–191.
7. Matsumura, T. (1998). Partial privatization in mixed duopoly. *Journal of Public Economics*, 70(3), 473–483.
8. Ottaviano, G., Tabuchi, T., & Thisse, J. F. (2002). Agglomeration and trade revisited. *International Economic Review*, 43(2), 409–436.