

**Changes in East Asian Regional Economic Structure during the Dynamic Process of
Economic Integration
- from the point of view of New Geographical Economics**

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1. Foreword

Geographical concentration of economic activity is a phenomenon observed not only in industrialized countries of North America or the integrated Europe, but also in the fast-developing East Asian region.

Few would argue against the statement that the center of global economic activities, in particular innovation activities, is North America, especially the United States. The United States is in an overwhelming economic position within the American continent, but once one looks within the country, its economic activities are concentrated around a few limited regions, such as part of the East Coast and part of the West Coast, among others. In Europe, a region called "banana", consisting of western Germany, the Benelux, north-eastern France and South-eastern part of the United Kingdom, has only a seven percent share of EU's surface area, but has one third of the population producing half of the GDP of EU.

Table 1-1 shows the importance of economic agglomeration in the defining Japan's and East Asia's regional economic structure. As the first column shows, in 2000, Japan, with a 3.5

percent share of the surface area of East Asia and 6.9 percent share of its population, produced 65 percent of GDP, 58 percent of manufacturing's share of GDP. ¹

Table 1-1 Degree of economic agglomeration in Japan and Japan-core vis-à-vis East Asia (2000)

	Share of Japan within East Asia (percent)	Share of Japan-core within Japan (percent)	Share of Japan-core within East Asia (percent)
Surface Area	3.5	5.2	0.18
Population	6.9 (7.9)	33 (33)	2 (2.5)
GDP	65 (72)	41 (40)	27 (29)
M-GDP	58 (68)	37 (44)	21 (29)
M-Employment	13 (32)	34 (31)	6 (10)

Note: East Asia = Japan + NIEs + ASEAN4 + China

Japan-core = Tokyo + Kanagawa + Aichi + Osaka + Hyogo

In parenthesis are figures for 1990

Source:

<http://devdata.worldbank.org/dataonline/> (Online version of the World Bank's "World Development Indicators"),

International Yearbook of Industrial Statistics(UNIDO)1995-2004

Data for Taiwan were collected from <http://www.dgbas.gov.tw/dgbas03/introdu.htm> and processed.

This kind of non-uniform repatriation can occur within a given country as well. The disparity among domestic regions is becoming a major policy concern for the EU. The second column of table 1-1 shows that in Japan, a large share of economic power is concentrated in Japan-core which consists here of the core of the Tokyo metropolis (Tokyo and Kanagawa prefecture), the Nagoya metropolis (Aichi prefecture), and the Osaka metropolis (Osaka and Hyogo prefectures). As can be seen from the table, Japan-core, which comprises only 5.2 percent of the country's surface area, has 33 percent of the population, 41 percent of GDP, 37 percent of GDP attributed to manufacturing and 34 percent of employment attributed to manufacturing. When looking at this Japan-core from the perspective of East Asia as a whole, as can be seen in the third column of the same table, in Japan-core with only a 0.18 percent share of the surface area and 2 percent of the population, is concentrated 27 percent of East Asia's GDP, 21 percent of GDP attributable to manufacturing, and 6 percent of employment attributable to manufacturing.

When economic integration is brought forward, what happens to economic activities from a geographical point of view? Largely speaking, two theories provide some insights.

First, according to the theory of comparative advantage, countries specialize in industries where they have comparative advantage based on differences in technology and available factors of production. In this theory, labor mobility is not taken into consideration.

Second, according to the new geographical economics, economic activities are expected to concentrate geographically as economic integration advances. At the background are such factors as economies of scale, transportation cost in the broader sense, and demand linkage.

Much evidence seems to show that industries are agglomerated more than a regular theory of comparative advantage would predict.

In the United States, notable economic agglomerations include New York as the center of finance and services, Silicon Valley as the global center of Information Technology (IT) industry. One research (Kim, 1995) suggests that geographical specialization of industries took place during the period prior to World War One, when the domestic transportation network was established and the integration of the national economy took place (however, geographical specialization seems to weaken slightly after the two World Wars). This tendency is reproduced in Europe, with an increasing geographical concentration of industry, and increased differentiation of industrial structure among countries take place as economic integration advances. Tendency toward specialization among many EU countries can also be shown by calculating the Krugman index. This tendency exists similarly in East Asia; aside from Japan and the NIEs, other parts of the region, for example China's Zhonguancun, Guanzhou, Suzhou, Industrialized areas of Eastern Thailand, Malaysia's Penang have demonstrated a high degree of economic agglomeration accompanied by remarkable growth.

Since Adam Smith's "Wealth of Nations", it has been customary to use "nation" as the major unit when economists argue about economic growth and changes in industrial structure. In international economics, the geographical relation of countries being examined was hardly taken into consideration. However, with the globalization of the international economy, issues arose that cannot be adequately explained with the traditional framework of national economy. In a European Union where people, goods and money go about freely, which city will become the center of finance? Where will new industrial zones be formed? What will happen to EU's adjacent regions? It is difficult to answer to those questions based on international economic analyzes which presupposes national borders. It is equally difficult to provide answers to the following questions that are directly relevant to this paper. How would one explain the rapid economic growth achieved of East Asian countries which while placing the market economy at the core, had an active government intervention toward economic growth, and deepened region-wide horizontal division of labor through a flying geese model with Japan at the helm? While growth has been tampered with after the financial crisis, what is the future growth path of the region? Will East Asia's economic growth based on "massive mobilization of resources" come to a halt in the near future as Krugman predicted?

It has recently been pointed out by a number of academics that a traditional national economic framework is insufficient to understand the recent economic growth of East Asia, and that it is necessary to consider East Asia in its entirety in the process of formation of an "international regional economic system" developing as a center of production and consumption. Hatch and Yamamura [1996] argues that the source of East Asian economic dynamism is the expanded application of Japan's production system based on Keiretsu onto East Asia. Yoshikazu Miyazaki [1995,1996] and Kasuya [1997] consider the industrialization of East Asia as the other side of the coin of the dismantling of the Japanese national economy which had a complete industrial structure, and was for a long time the region's sole advanced industrialized economy. If East Asia's rapid industrialization is in a relative position to the transformation of Japan's economic structure, then the recent changes in Japan's regional structure must have a close relation to the development of an international production system in East Asia. In particular the problems of "industrial hallowing-out" or the "collapse of local industries" experienced recently by many regions of Japan, or other phenomena such as the decline of the agglomeration of industrial foundation as evidenced by Higashi-Osaka or Tokyo's Ota-ward, or the monopolar concentration into Tokyo might be considered to be part of a global process of the formation of an international regional economic system in East Asia.

If all economic activities are constant returns to scale as hypothesized in typical

neo-classical international economic theory, and if the market is under perfect competition, the resulting market equilibrium is efficient, as putting aside the distribution of income, there is no role for national and local governments to play. In this case, for example, the industrial hollowing out in Japan is just a result of economic activities seeking cheaper labor in the rest of Asia, and there should not be any problem.

However, when one looks at actual economic phenomena, in many cases, economies of scale are at work in the background. Many real-life phenomena cannot be explained without taking into consideration economies of scale. These include 1) horizontal division of labor in international economics include East Asia, and the development of intra-industry trade; 2) the rapidly growing multinational enterprises (MNEs) and intra-firm trade; 3) the formation of cities of a variety of size, from Shanghai and Tokyo on one end, to unrecognized small cities; 4) agglomeration of numerous small- and medium-sized enterprises in Silicon Valley, along the Tama River in Tokyo, and in Higashi-Osaka; 5) the formation of “castle towns” around large firms such as Toyota-city and Kitakyushu. In a regional economic system where economies of scale play an important role, numerous phenomena that cannot exist in a traditional neo-classical world based on constant returns to scale as will be developed further in section. This implies that there is the possibility for national and local governments to play an active role in areas aside redistribution of income and regulatory reform.

The so-called new geographical economics has been constructed by such academics as Paul Krugman, as an alternative to neo-classical international economics. This new geographical economics attempts at providing a unified understanding to the formation and transformation of geographical/regional economic systems at all levels, centered on agglomeration and self-organization that stem from the mutual interaction between economies of scale and the transportation costs (in its larger sense). The basic thinking behind this new geographical economics is similar to the classical location theory or that of economic geography, and goes against traditional international trade theory. According to Krugman [1994], traditional international economics is founded on a conception of a world where factors of production including capital and labor cannot move across national borders, whereas goods and services can move at no cost. However, in a world where globalization is proceeding rapidly, it is necessary to consider a world based on classical location theory where there is mobility of factors of production, and where cost is associated with the movement of goods and services, and build a general new geographical economics. Moreover, the thinking goes that an international regional economic system where national borders play an important role, should be considered as a special case of this new geographical economics. Of course, to explain geographical concentration of economic activities (as seen in reality) at an international or local level in a world where factors of production can move relatively freely, one needs to introduce economies of scale.

In this paper, attempts will be made to provide a unified analysis of the transformation of the regional economic structure in Japan after the war and the recent development of international regional economic system in East Asia, all from the point of view of the new geographical economics. This will lead to an analysis of specialization and diversification in economic agglomeration, and will give an insight to its implication to currency adjustment in East Asia.

First, section 2 will explain the basic mechanism of the formation of regional economic systems and its long-term transformation, from the position of the new geographical economics. In particular, it will be pointed out that phenomena that accompanied the recent rapid economic

growth of East Asia (such as growth based on “massive mobilization of resources”, flying-geese model, the hollowing-out of the Japanese economy or the monopolar concentration into Tokyo) are phenomena that are commonly observed in a period of growth of the regional economic system as a whole, which consists of a “core economy” and the surrounding “frontier economies”. Finally, the section will take stock of past research on specialization and diversification as elements that influence the growth of agglomeration.

Based on the basic perspective of section 2 as background, section three will analyze transformation of post war regional economic system in Japan, and the recent transformation of East Asian regional economic system as it relates to Japan. Section 4 will examine the degree of specialization in specific regions of East Asia. Finally, section 5 will conclude by commenting on currency adjustment in East Asia, based on analyzes of previous sections.

2. Self-organization and changes in the regional economic system

This section will examine the self-organization of regional economic system and its transformation from the perspective of the new geographical economics.

It cannot be denied that differences in “the first nature”, that is natural conditions such as weather, mineral resource, quality of soil or topography have played an important role in defining international and domestic trade patterns, or the industrial structure within countries and regions. However, the importance of such natural conditions is decreasing constantly as the share of primary industry is decreasing in the global economy at large as well as for most countries. At the same time, it can be said that the relative importance of “the second nature”, that is social conditions that have been formed through the historical process of human activities (politics, economics, culture etc.), has increased. It is clear that national borders have played a significant role in the formation of the second nature. In particular, the accumulation of human capital or the overall education level in each country is a deciding factor of economic performance of the country. Within a given country, factors of production such as labor and capital (excluding land) can move relatively freely. In this case, agglomeration economics stemming from the agglomeration of particular industry and economic activities, and the human and physical capital in a specific location, can be said to form the second nature. This agglomeration economics can be considered to be becoming increasingly important for the international economics at present when the role of national border is decreasing.

The actual situations of geographical concentration of economic activities in North America, Europe, East Asia and Japan are as aforementioned. Looking at Japan-core vis-à-vis East Asia, as seen in the third column of table 1-1, Japan-core with a 0.18 percent of the surface area of East Asia, produces 29 percent of the GDP, 29 percent of GDP attributable to manufacturing and employs 10 percent of labor attributable to manufacturing. Taking into consideration the fact that labor and capital can both move freely within Japan, and that the movement of (financial) capital is more or less liberalized in East Asia, it is close to impossible to explain the extraordinary concentration of economic activities of Japan and of Japan-core without some form of agglomeration economics.

As theoretical background to empirical analysis in succeeding sections, an overall explanation of the formation of agglomeration will be provided in the following sub-section 1. An explanation of the growth of the agglomeration and the lock-in effect resulting from the agglomeration will be provided in sub-section 2. Section 3 will explain about the

self-organization of regional economic systems and its dynamism, with concrete historical cases. Finally, section 5 will provide a stock-taking of past research on specialization and diversification as they concern agglomeration economics.

2.1 Formation of agglomerations

The first important thing that one needs to be reminded of when attempting to understand agglomeration economics, or the mechanism that create economic agglomerations, is that in a classical general equilibrium world where all goods are produced a constant returns to scale, agglomerations do not form. In such a world, unless a first nature brings about externally, comparative advantage among regions, by having all goods produced at all locations (at minute scales), the cost of transportation can be completely avoided, and a most efficient equilibrium can be attained. In a more general term, the following theorem by Starett [1978] stands.

Spacial Impossibility Theorem: In a homogeneous space where the first nature does not have any effect, if the condition of perfect market (that at all locations, there is a perfect market for all goods) is met, there can be no competitive equilibrium² that accompanies a positive cost of transportation.

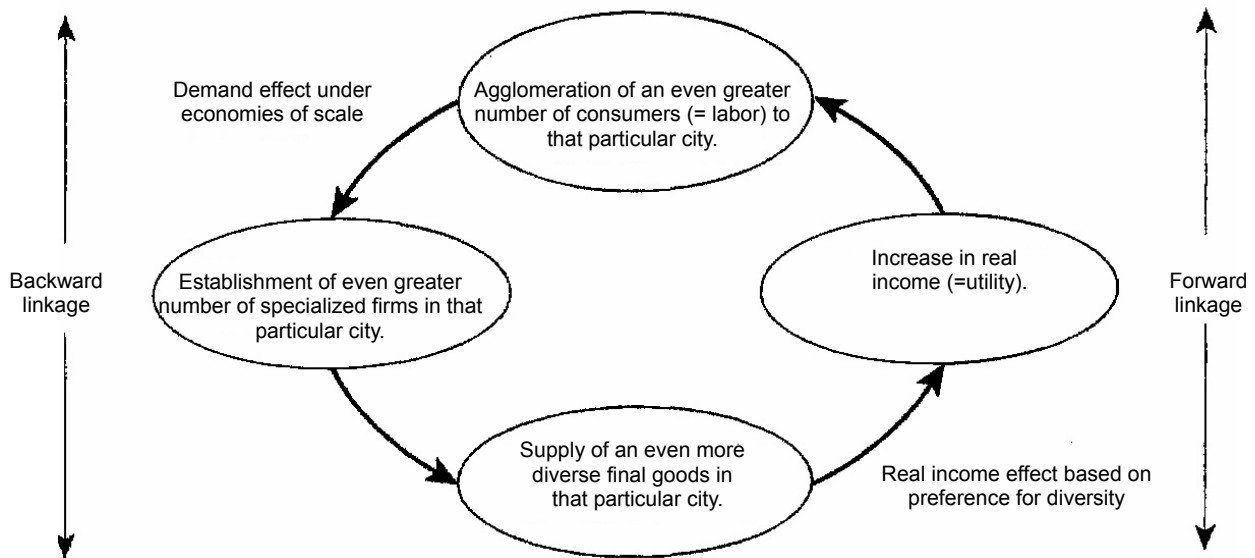
According to this theorem, in a world of perfect market, unless the first nature brings about an externality, only a special equilibrium where all locations are self-sufficient and does not accompany any transportation of goods, is possible. Therefore, a special agglomeration of economic activities that accompany regional specialization is not possible. In other words, in attempting to explain a real-life agglomeration phenomenon (e.g. the concentration of 30 million people into Tokyo metropolis), the model has to inherently include an element of market failure that cause an economic externality. Here, the externality comprises both the technological externalities coming from the non-market mutual action between firms or households (such as the exchange of information and knowledge based on communication, or spillovers), and pecuniary externalities stemming from an imperfect competition.

The general thinking common to recent research result in the new geographical economics, is that agglomerations are formed from the interaction of economies of scale in the production of goods (and services), the cost of transportation of goods, and the diversity of goods and people, that is more precisely, a) diversity of consumption goods; b) diversity of intermediary goods, c) diversity of people.

Figure 2-1 shows the mechanism through which firms and consumers (=labor) agglomerate into a city attracted by the diversity of consumption goods present. Let us assume that there was a supply of a yet more diverse set of consumption goods in a particular city, as shown in the bottom center ellipse in the figure. Based on the preference for diversity for consumption goods, the real income (=utility) of workers (=consumers) increases relative to nominal income in that city. This leads to more labor moving into that city, increasing further more the demand for consumption goods, which will then attract yet more businesses producing diverse consumption goods. This implies that in that particular city, it is possible to obtain an even greater variety of consumption goods. That is to say, a positive feed-back mechanism that allows firms and labor to agglomerate is created, based on forward linkage effect (the supply of a more diverse consumption goods increases worker's real income) and backward linkage (a larger market for consumption goods attracts a greater number of specialized consumption goods producers). One important element to note here is that the backward linkage effect takes

place only at the presence of economies of scale at the firm level at the production of every consumer goods. Otherwise, every kind of consumer goods ends up being produced in every city/region. That is to say, the economies of scale at each firm's level go through this cyclical correlation effect and provide an increasing return to scale at the city-level, generating agglomeration.³

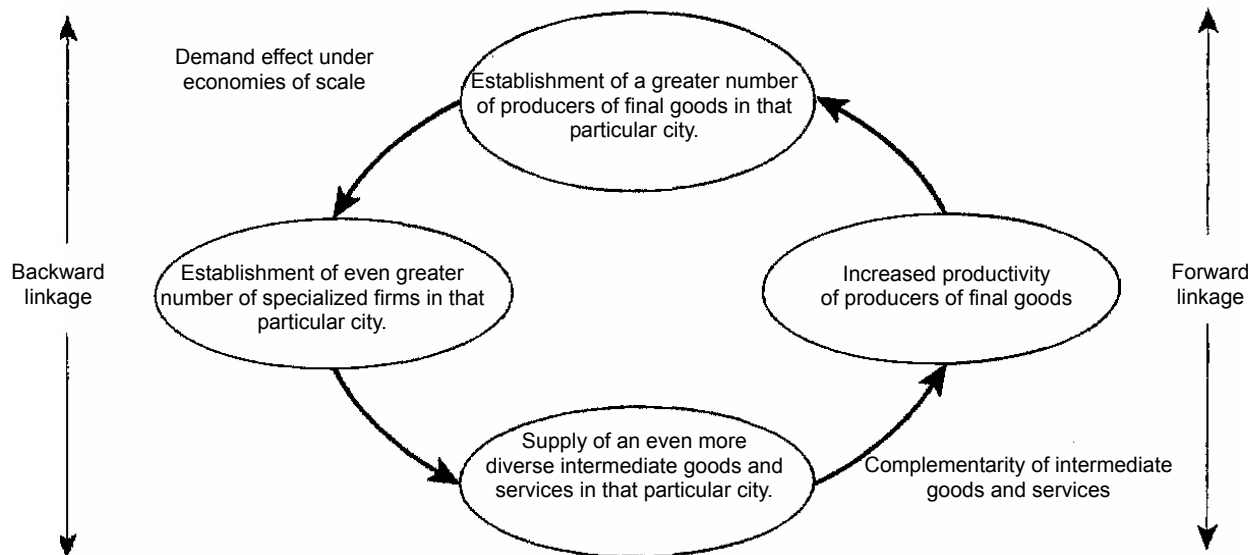
Figure 2-1 Agglomeration of producers of consumer goods, and consumers (=labor) based on circular causality



Source: Fujita (2003), figure 6-2 a

The above provides an explanation for a particular city's ability to attract agglomeration, based on the diversity of consumption goods. Figure 2-1 and figure 2-2 show a similar mechanism of the formation of geographical agglomeration based on the relationship between producers of diverse intermediate goods and producers of final goods who use those intermediate goods. That is to say, the supply of a diversified intermediate goods in a particular city or region increases the productivity of industries that use those intermediate goods (forward linkage effect), thereby attracting more firms. At the same time, the increase in demand in this intermediate goods market attracts more producers of specialized intermediate goods (backward linkage). This cyclical correlation effect leads to the agglomeration of producers of intermediate goods and industries that use those intermediate goods. Furthermore, this agglomeration contributes to regional specificity of particular industries (e.g. development of local industries and agglomeration of central management functions in medium- to large-scale cities).

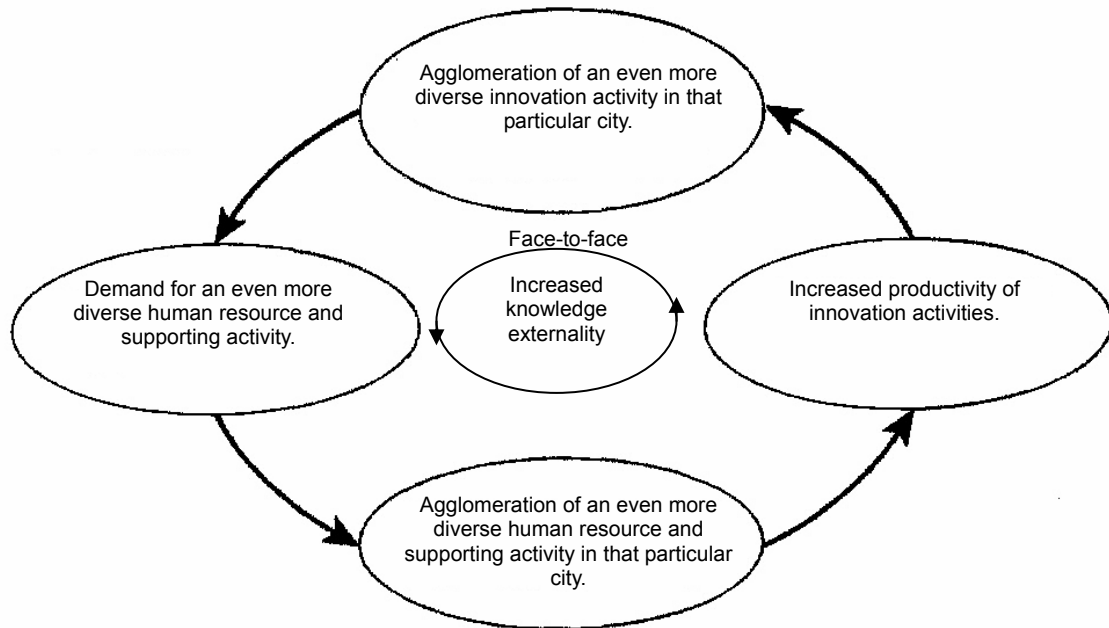
Figure 2-2 Agglomeration of producers of final goods and intermediate goods and services based on circular causality



Source: Fujita (2003), figure 6-2 b

The agglomeration process presented so far is based on pecuniary externalities coming from market transactions of consumer goods or intermediate goods. However, as far as the actual development of cities and local industries go, the aforementioned technological externalities stemming from non-market correlation are also crucial. In particular, the face-to-face business processes and social communication play an important role for regional agglomeration of particular industries and technological innovation at a regional level, as first pointed out by Marshall [1890] and later emphasized by Jacobs [1969] and Lucas [1989] in their research on New York's specialized areas (fashion, finance, diamonds) and by Saxenian [1994] in the research on Silicon Valley. Of course the necessity and effectiveness of interpersonal communication presupposes the diversity of the human nature.

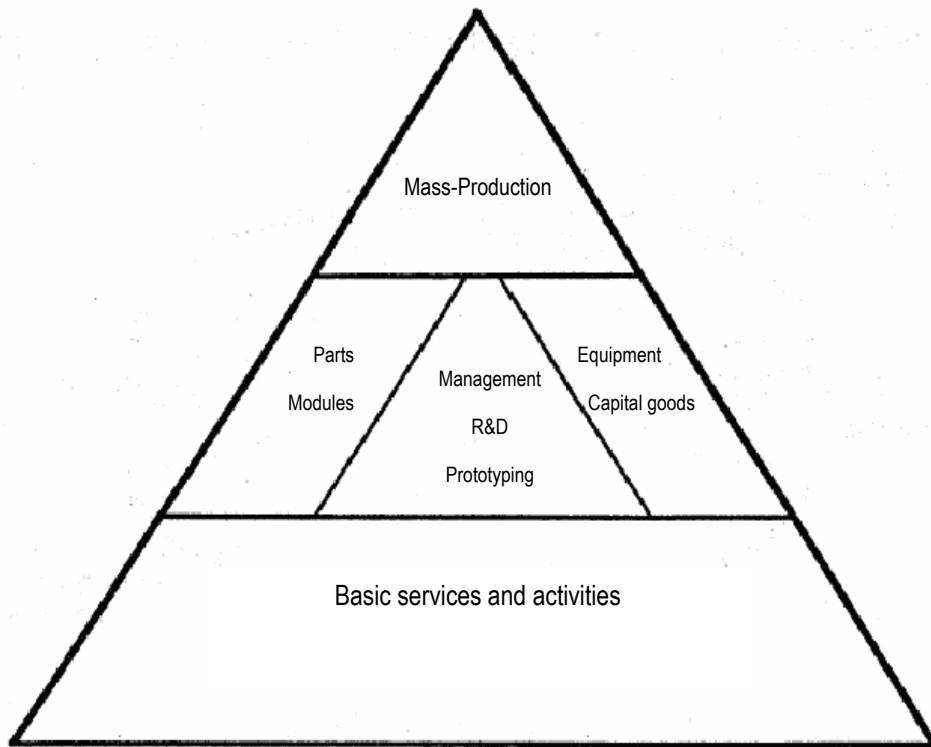
Figure 2-3 Formation of an innovation space centered on diversity of people



Source: Fujita (2003), figure 6-3

Next, the formation of agglomeration in manufacturing industries will be examined using a diagram. This conceptual diagram will help understand the structure of agglomeration of production activities of assembly industries (such as electric machinery, transportation machinery, precision machinery, general machinery and plastic products) which has, for the past few decades, been Japan's leading industries. ⁴

Figure 2-4 Production activity in the manufacturing industry



Let us consider the case of the production of personal computers. Personal computers are mass-produced through an assembly process using production equipment, capital goods and labor, from parts and modules. However, in the processes that lead to mass-production, there has to be first a planning stage at the firm's headquarters' strategic management branch, followed by research and development at the research branch, and a process of prototyping that will improve the design and finally leading to mass-production. During this process, an enormous amount of parts needs to be developed / designed together with parts manufacturers. In a similar manner, in the process of defining the most efficient mass-production method, the most appropriate production equipment needs to be designed with the collaboration of production equipment manufacturers. Moreover, the collaboration of countless small- and medium-sized subcontracted firms that provide basic services founded on high-skilled processing technology (e.g. molding, forging, pressing and heat-processing), during the entire process from research and development to prototyping. Finally, even after the mass-production system is more or less finalized, production facilities need to be built together with production equipment manufacturers, and the actual mass-production needs to take place through the purchase of parts from parts manufacturers "just-in-time". Of course, during the entire process described above, innumerable managers, researchers, technicians, skilled and other workers are involved. At a time, like the present, when firms' competitiveness is defined by the incessant introduction of new products based on technological innovation, firms need to carry out the aforementioned process starting from the R&D of new products to their mass-production, concurrently for multiple products.

What can be understood from the above example is that first, “assembly industries” which have for the past few decades been Japan’s leading industry, are made possible only by putting together a multitude of intermediate goods (in a larger sense including business services). Second, that an extremely diverse workforce is involved in the production of intermediate goods.

As mentioned above, these diversified intermediate goods, and workforce, generally speaking, become a driving force of agglomeration. There are countless examples going from machinery industries agglomerated alongside Tokyo’s Tama River and similar agglomeration in Higashi-Osaka, agglomeration of auto and auto-parts industries in Kanagawa and Aichi prefectures, to the agglomeration of semiconductor and IT industries in Silicon Valley.

That said, every production activity shown in figure 2-4 need not be agglomerated at a single location/region. The growth of agglomeration increases wages and land prices. Thus, if for example the transportation cost (in a larger sense of the meaning) of intermediate goods is low, it is possible for the mass-production site to be located away from the site of agglomeration of other activities, to locations with cheaper labor and land prices, or locations near large markets. In reality, a flexible production network is being formed in East Asia as a whole, and fragmentation of corporate activities is observed, resulting from the firms’ international expansion.

2.2 *Growth of Agglomeration and lock-in effect*

At the early stages of agglomeration, be they local industry or cities, a factor of coincidence is at play to a certain extent in many cases. This is because at the presence of many locations with similar conditions, even a minute opportunity at a particular location can create initial advantage. This opportunity can be a particular individual or firm, or the presence of a particular university or local government policy, but this opportunity act as a catalyst (as a catalyst in a chemical reaction) and can ignite the initial formation of agglomeration. However, the impact of the initial opportunity should not be overemphasized. This is because when there are multiple locations with enough conditions to start agglomeration, a small coincidence can play a role, but it is hard for agglomeration to take place at a location with just the initial opportunity but without the necessary preconditions.⁵

A particular agglomeration takes place at a location with the necessary natural and social conditions, with a certain degree of coincidence at play. In any case, when agglomeration takes place be it as a form of a city or agglomeration of a certain industry, a self-proliferation advantage of economic agglomeration comes to play, creating a lock-in effect at the location of the agglomeration, making it harder for individual entities to leave the agglomeration, and attracting new entities. While this lock-in effect of agglomeration has a strong positive effect that promotes growth at the relatively initial stages of agglomeration, but in the long-term, can also have a negative effect of alienating possible transformation and innovation of the agglomeration.⁶

Generally speaking, the larger the externality among the constituency of the core of the agglomeration, the greater is the force of agglomeration. First, the greater the degree of differentiation among the constituency at the lower level of agglomeration producing more diverse intermediate goods, and the more expensive the cost of transportation of intermediate goods, the stronger is the pecuniary externality that is generated within the agglomeration.

Similarly, the more diverse the workforce producing intermediate goods, and the more intense is the face-to-face communication, the larger is the technological externality.

Meanwhile, the more differentiated the final products produced by the higher level of a particular agglomeration, and the lower their transportation cost, the more global is the market of the final product. If the final product of the agglomeration is a service (including informal information or knowledge), part of the final good is transported to an external market by means of person-trips. Therefore, the geographical advantage of the location from the perspective of transportation also becomes important. Similarly, if the intermediate goods produced by the lower level or the mid-level of the agglomeration are highly differentiated, the product can possess a broad external market.

When an agglomeration has a strong power of agglomeration (in the above sense), and has a global market, the agglomeration can have a strong lock-in effect at the location. New firms conducting similar activities as those carried out within the agglomeration, and workforce with relevant skills are attracted to the agglomeration by its strong lock-in effect. As a result the agglomeration has an even stronger force of agglomeration. Furthermore, if the activity or the group of firms within the agglomeration belongs to growth industries of that particular period in time, the agglomeration grows with the industry. For example, Silicon Valley which is an agglomeration of numerous small- and medium-sized enterprises (and a smaller number of large firms) centered on the design and technological development of semiconductors, personal computers and other information technology-related products, have a strong power of agglomeration in the above sense, and its final products (design and technology, and electronic devices that incorporate them) are the entire globe as its market. Silicon Valley which is the world's largest agglomeration of technological development of electronics, has grown together with the growth of the electronics industry since the 1950's, absorbing not only from the U.S. but also from the rest of the world, the world's most dynamic and talented human resource and the rich venture capital. Although there are efforts worldwide to create a second Silicon Valley, at the presence of the strong lock-in effect of Silicon Valley, it is hard to envisage the creation of a similarly large agglomeration in the same field. In Japan, the aforementioned agglomeration of small- and medium-sized enterprises in machinery and metal industry along the Tama river (and the numerous large firms that are supported by the basic services provided by the constituency of the agglomeration), has grown together with Japan's machinery industry, as it continued to attract skilled and dynamic human resource from the rest of Japan. A similar agglomeration in Higashi-Osaka has supported the growth of machinery and metal industry of the western part of Japan, especially Osaka.

The lock-in effect of an agglomeration is a major factor that promotes the growth of the agglomeration, but in the long-run, it can be an internal factor that alienates further growth and transformation of the agglomeration. This negative effect is based on the fixation of industrial structure and culture taking place together with the growth of the agglomeration, and also together with the negative effect that can occur normally, i.e. the increase in wages and land prices. A good illustration is again the Silicon Valley which grew from an agglomeration of small- and medium-sized enterprises to a grouping of inflexible large enterprises, falling into a crisis in the early 1980's together with the rapid growth of the semiconductor industry in Japan, and whose crisis was overcome by the birth of new small- and medium-sized enterprises

In Japan, it has also been pointed out frequently that much of local industries and industrial agglomeration along Tama-river and Higashi-Osaka were following the path of decline.⁷ This can be considered as the result of general economic factor applying to Japan as a

whole (such as the strong yen), but at the same time the negative impact of the agglomeration's lock-in effect becoming apparent. Taking the example of the industrial agglomeration in Tokyo's Ota-ward, the constituting small- and medium-sized enterprises exist as part of the business-to-business network within the agglomeration. Consequently, even when the land prices of the Ota-ward became high (owing to increased demand of office space and resident space for people working there), and when the large firms no longer carry out their production activity there as Tokyo and Kanagawa prefecture's main economic activity shifted from manufacturing to office-centered activities, it is difficult for small- and medium-sized enterprises to shift their location of activity outside of the regional network, to a location with cheaper land prices. They cannot relocate even when large apartment complexes and office buildings are built around them, and they cannot modernize their factory's equipment at a location with no future where the land price continues to rise. The resulting picture is the increasing number of factories that close their doors together with the retirement of their owners.

There are two distinct views on the present condition of Ota-ward. One view, as represented by Seki [1993, 1997] is that the collapse of the industrial foundation agglomeration centered on the Ota-ward, leads to the collapse of the manufacturing sector of Japan as whole, which was built upon it. The other view is represented by that of professor Watanabe of Keio University, who argues in "The expansion of manufacturing into Asia, and the industrial hollowing out" [1995, p.77 and p.82] that "when looking at Ota-ward as a region, it may seem that it is losing its dynamism as the number of factories is decreasing. However, when taking into consideration the spreading of the industrial area, not only is it not shrinking from a quantitative perspective, but its quality is improving. . . . the network of small- and medium enterprises was formerly centered on the Keihin area (area covering the south –end of Tokyo and west-end of Kanagawa prefecture), but later spread to the rest of Japan in the 1970's and 1980's, and saw its completion".

Which view is correct, that is to say, whether the network of small- and medium-sized enterprises forming the basis of Japan's manufacturing sector is closed at the southern section of Tokyo, complete in the Kanto region, or has spread Japan-wide, is a crucial question when thinking about the future of Japan's manufacturing and its regional economy, and will necessitate an elaborated empirical study. In either case, this type of agglomeration of industrial foundation is established on externalities that created the agglomeration in the first place, and hence, it is not clear if the situation can be solved efficiently only through the efforts of the small- and medium-sized enterprises. Therefore, it is necessary for national and local governments to actively consider policies related to the maintenance and innovation of such agglomerations.

2.3. *Self-organization and dynamism of regional economic systems*

As mentioned above, each agglomeration create have a lock-in effect at the location of the agglomeration. The lock-in effect of each agglomeration leads to the creation of inertia around the location surrounding the regional economic system. This lock-in effect is the reason for which the agglomeration continues to flourish even after the initial advantage based on externalities disappears (e.g. port cities such as London, Paris, Chicago, New York or Osaka). However this strong inertia of regional economic systems does not go against long-term structural transformation of the regional economic system. As the following examples show, in actuality any economic space at any level (the entire world, a part thereof in the form of international regional economic system, a country or a metropolis) continue to transform

through major structural changes. This change in space structure is path dependent in the sense that past structures have an influence of the shape of future structures. Therefore the difference in the initial conditions can lead to different space structures. However, any relatively united regional economic system tends to, in the long-run, self-organize a multi-layered space structure with one or a few core-regions at the top. In general, this multi-layered system has fractal structure, with similar structure observed in different partial space level, especially of the core-periphery type. It is of course possible, in the longer-term, that the regional economic system continues its transformation as new cores or sub-cores appear in surrounding areas.⁸

Looking at a particular partial region in the long-term process of structural change of regional economic system as a whole, one is likely to observe a series of phenomena such as the growth or the decline of the regional economy, the hollowing-out of certain industry groups, or shifting to industries with higher productivity. In the case where the regional economic system as a whole is experiencing growth, at the initial stage when the surrounding areas begin their economic growth as “frontier economy”, one can observe massive mobilization of resources including land, labor and capital.⁹ Therefore, to fully comprehend the changes occurring in each partial region, one needs to first understand the dynamism of the regional economic system as a whole.

The major internal and external factors of change that induce the aforementioned long-term dynamism of the regional economic system include: a) the reduction in transportation cost (in its wider sense of the meaning); b) the advancement of production technology and the development of new products and goods; c) population growth and accumulation of human resources; d) accumulation of capital, and e) accumulation of information and knowledge.

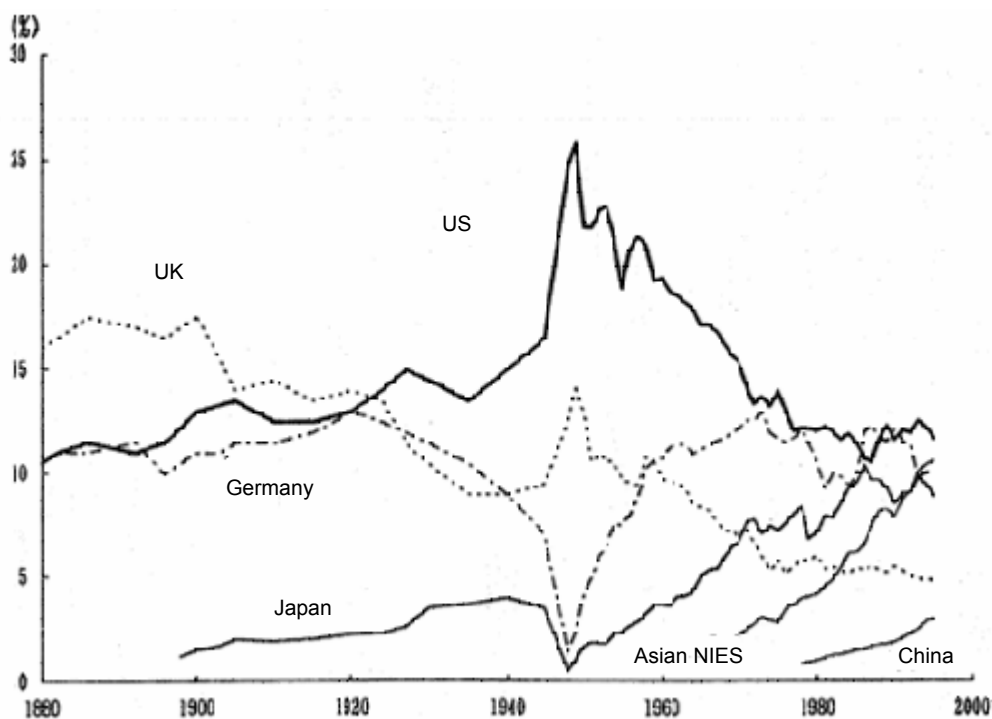
In particular, reduction of the “cost of transportation”, a notion peculiar to spacial economics, needs to be interpreted broadly. First, one needs to make the distinction between the cost necessary for the movement of goods and people, and the cost of the movement of information using various means of communications. Next, one also needs to take into account, that in the case of international trade in goods, the transportation costs would include not only the usual cost of transportation in the narrower sense (including logistic cost), but also costs associated with tariff and non-tariff barriers, costs associated with foreign exchange risk, costs associated with the difference in language and culture, some of which are difficult to quantify. These costs of transportation in the broader sense have historically been on decrease constantly, through the advancement of transportation and communication technologies. In particular, the cost of transportation in the wider sense has been decreasing rapidly during the last few decades, with the advancement of aviation, telecommunication technologies, as well as the liberalization of trade, investment and finance.¹⁰

As an example that demonstrates the long-term structural change of regional economic system, figure 2-5 shows the changes in the world share of export of major industrialized countries since 1880. As is well-known, industrial revolution centered on textile and steel industry took place in the United Kingdom two centuries ago. For a while, the United Kingdom has been leading world trade as the sole advanced industrialized economy. However in mid 19th century, when the new chemical and electric machinery industries were born, Germany and the United States which grew with these new industries leapfrogged the United Kingdom prospering up until then owing to textile and steel industries. (This phenomenon of new industry leapfrogging existing agglomeration can be considered to be a negative side of the agglomeration’s lock-in effect.¹¹). Later, Germany and the United States steadily continued their industrialization, and as seen in figure 2-5, gained shares of world export equivalent to that

of the United Kingdom by 1920. This suggests that the two frontier economies of the Germany and the United States developed to a core economy similar to the United Kingdom.

In the meantime, it can be inferred from figure 2-5, that Japan which was at that time a frontier economy, went through a process of industrialization. Later, through economic competition between the four countries (UK, Germany, US and Japan), and the two world wars that were in part caused by this competition, rapid industrialization took place again in Germany and Japan which lost the war, and as shown in the figure, and reached, at the beginning of the 1980's the same level of world export share as the United States, entering once again a period of economic friction. In the meantime, after the 1970's, rapid industrialization took place in the four countries of what was later coined as NIEs, which were at that time frontier economies in Asia, where Japan was the only advanced industrialized country. It can be seen from the figure that by the early 1990's the NIEs together obtained the same level of world share of export as the then core economies of the United States, Germany and Japan. It suggests that the frontier of the long term wave of industrialization which took place during the past two centuries, finally reached the developing countries of East Asia

Figure 2-5 Share of export to world exports (percent)



Source: IMF "International Financial Statistics"

Although it is a rather rough argument, the above example suggests the long-term transformation process of the world economy's space structure, through which "a number of economies located in peripheral areas of core economies, went through a period of frontier economy, achieved rapid industrialization and became core economies, as the long-term global

wave of industrialization propagated.”

Meanwhile, “when during a process of continued growth of a regional economic system comprising one core-economy at the center and its peripheral areas, a “flying geese” type of industry transfer takes place from the core economy to frontier economies, and in the long term form a multi-layered spacial economic structure”. A good example is the development process of regional and metropolitan economic system since the 19th century in the United States.¹²

2.4. *Dynamism of agglomeration – specialization, diversification and competition*

The previous sub-section discussed about the formation of agglomeration from the interaction of “economies of scale”, “transportation cost”, and “the diversity of goods and people”. This sub-section will look at the economic characteristics stemming from the peculiarity of each agglomeration, that is to say the dynamic impact of the economies of regional specialization and urbanization, on the long-term growth of metropolis, a recent active research field. The economies of regional specialization place an importance of propagation of knowledge among firms belonging to the same industry in a particular city. It is often referred to as the “economies of specialization”, or “Marshall-Arrow-Romer (MAR) economies” based on the economists who advocated it. In this type of economy, individual firms do not carry out their activities based solely on their specific knowledge, but rather firms involved in similar activities communicate and utilize their knowledge among themselves, and mutually develop, leading to the growth of the city. The latter “economy of urbanization” argues that the most important type of knowledge propagation is not among firms in the same line of business, but rather among firms in different types of activity. It is often referred to as “economies of diversity” or “Jacobs economies”. In this kind of economy, a variety of type of industry exist within a city, and through the exchange of knowledge among them, leading to innovation that cannot take place through knowledge exchange within the same line of business, which will ultimately induce the development and growth of the city. In addition to the aforementioned two economies, Porter and others emphasize the importance of a “competitive environment” in cities. Figure __ summarizes the above discussion. As far as the discussion on the competitive situation, there is a difference between the “economies of specialization” and the point of view advocated by Porter. From the point of view that emphasizes the “economies of specialization”, regional monopoly is considered benign for long-term technological innovation and growth, because the knowledge propagation (which is an externality) can be internalized within the particular firm. From Porter’s perspective, however, a competitive production environment is favored. This is because the internalization of knowledge propagation through regional monopoly becomes an impediment to long-term technological innovation and growth. Rather, the development of regional competition contributes to dynamic exchange within and among industries, as well as to the acquisition of new knowledge, and therefore realize long-term growth.

On the question as to which of three elements raised above, that is 1) diversity; 2) specialization, and 3) competition, is important, numerous empirical research using U.S. data suggest the following points among others. 1) Competition and diversity have a close relation to internally generated growth of cities (Glaeser, Kallal, Scheinkman and Shleifer (1992)). 2) Industrial specificity plays an important role. For a mature industry, the benefit of specialization of the MAR-type is important but the benefit of diversity not particularly so, whereas for new industries, the benefit of specialization and diversity are equally important (Henderson, Kuncoro and Turner (1995)). 3) Competition and diversity have a positive impact on innovation within a city, where specialization has has a negative impact (Feldman and Audretsch (1999)).

Table 2-1 Summary of empirical research on the impact of specialization, diversity and competition

		Specialization	Diversity	Competition
1)	Growth of the city	—	○	○
2)	Contribution to mature industries	○	—	—
	Contribution to new industries	○	○	—
3)	Innovation within a city	×	○	○

1) Glaeser, Kallal, Scheinkman, and Shleifer (1992)

2) Henderson, Kuncoro, Turner (1995)

3) Feldman and Audretsch (1999)

Based on the above discussion, it is argued that the following five facts concerning the internally-generated growth of the city can be mentioned. 1) Specialization and diversity are not inconsistent with each other, but the benefit from both can co-exist within a given city. 2) The larger the city, the easier the diversification. 3) The scale of the city and its position within a larger picture is stable over time. 4) The growth of the city is determined by specialization and diversity and its spacial positioning. 5) Innovation (and new industries as well) are initiated in diversified cities which, as the industry matures, move to specialized cities. In particular, Silicon Valley, a typical example of case 5 above, i.e. an agglomeration with active innovation, has numerous fora where top executives and engineers from different firms can exchange information and study from each other's experience, and it is often argued that this constant dialogue and exchange is the source of growth (Saxenian (1994)). In UK's textile industry of the 19th century, also, interesting cases are observed concerning diversity. The lack of diversity in Manchester which possessed an extremely production system, and its presence in Birmingham which at first sight looked unorganized and inefficient, are attributed to the eventual decline of the former and the growth of the latter (Jacobs (1995)).

Applying the above findings concerning the internally-generated growth of cities to the various issues Japan is currently facing, one can point to two possibilities that explain the current situation. First is if one assumes that Japan is currently in shortage of innovation, there are two possible reasons: either the current Japan has lost the benefit of diversity, or that although Japan remains diverse, the mechanism to extract benefit from it is weakening. Second, the overseas development of Japanese firms to Asia might be just an example of mature industries relocating from a city with diversity, to a specialized city.

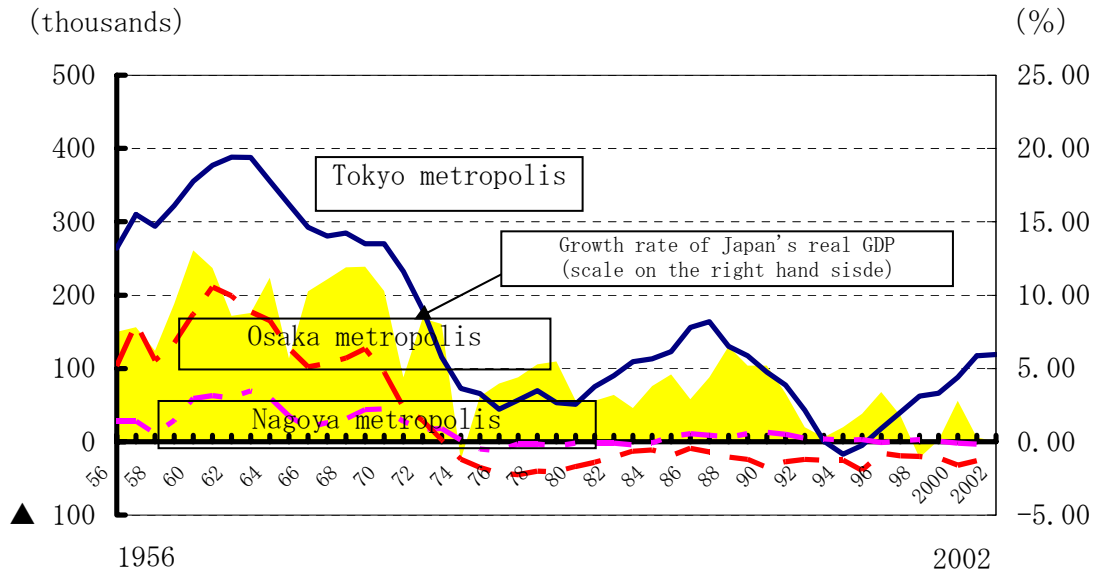
3. Transformation of regional economic systems in Japan and the rest of East Asia

3.1 Changes in Japan's regional economic structure

Let us now look at the three cycles in the change of our country's regional structure.

Japan's national economy has experienced two structural transformation of its regional economy, and is currently in a third such cycle. Figure 3-1 shows the net increase inflow of population into Japan's three largest metropolitan areas.

Figure 3-1 Net population inflow into Japan's three largest metropolitan areas



(Note) Tokyo Area : Tokyo, Kanagawa, Chiba, Saitama
 Nagoya Area : Aichi, Mie, Gifu
 Osaka Area : Osaka, Kyoto, Hyogo, Nara
 (Source) *Population movement tables* (Ministry of Home Affairs), *National Accounts* (Cabinet Office), *Japan's Metropolises* (Ministry of Land, Infrastructure and Transport)

(a) First period: from the 1950's to late 1970's

During the first period, net inflow is observed in all three metropolitan areas. This tendency peaks out once in late 1970's, after the oil-shock (figure 3-1). During this cycle, agglomeration took place through businesses and consumers (labor) seeking for variety in consumption goods. Meanwhile, the concentration of businesses and labor into large metropolises caused crowding out in the form of increase in land prices and wage in cities. Through this mechanism, agglomeration into cities was suppressed and land-intensive industries that use imported raw materials such as steel and petrochemical industries, or labor-intensive light- and assembly industries were relocated to adjacent areas, forming regional industrial cities as can be seen in the Pacific Belt.

Looking at changes in the industry structure, the ratio of secondary industry is consistently increasing up to 1970. But during the 1970's when crowding out started to occur in the three largest metropolitan areas, the ratio of tertiary industry increased considerably, and that of secondary industry started to decrease. Meanwhile, the ratio of primary industry decreased rapidly during this period, with no change in this tendency up to the present. Looking at specific regions, in Tokyo and Osaka metropolis, the ratio of secondary industry increased consistently up to 1970, with the share of tertiary industry increasing with the advent of the 1970's.

The productivity of all industries seems to be converging during this period. That is to say, the relatively high productivity of the Tokyo metropolis and Osaka metropolis is decreasing,

while that of the region with relative low productivity is increasing.

Looking at the structural change of Japan's manufacturing sector, while the share of the textile industry is decreasing, the manufacturing sector overall is growing, from metallurgy to machinery.

(b) Second period: late 1970's to mid-1990

During the second period, there is net inflow of population only toward the Tokyo metropolis, with no net inflow into either Osaka metropolis or Nagoya metropolis (see figure 3-1). A monopolar concentration to Tokyo took place during this period, likely reflecting changes in the world economy, as well as changes in the position of the Japanese economy within it. Up to the 1970's large metropolis were formed on the basis of the following two "economies of agglomerations". 1) "Economics of agglomerations" based on the vicinity of central management, and research and development functions of corporations and government agencies, 2) "economies of agglomerations" based on the vicinity between the producers of final products and intermediary products, and consumers. However, trade and investment liberalization and the development of transportation and telecommunication has made the second type of "economies of agglomerations" less relevant, and as a result, industries which do not require "economies of agglomerations" stemming from established mass-production, were relocated to regional cities within Japan, and to other parts of East Asia. In this manner, economic activities in large cities since 1980, started to concentrate on information and knowledge-based activities centered on central management and R&D functions of corporations and government agencies. In an era of developed means of transportation and telecommunication, this type of information-knowledge-based activities do not need to take place in multiple locations, hence monopolar concentration into Tokyo seems to have taken place, an example of straw effect. Later, the hike in land prices through the bubble economy induced population outflow from Tokyo.

From an industry structure point of view, this period corresponds to the period marked with the advancement of the service economy, with substantial increase of the share of tertiary industry, and corresponding decrease of the secondary industry. Region-wise, the tendency is most marked in the Tokyo metropolis.

The productivity has increased significantly in late 1980's in Tokyo metropolis. However this tendency cannot be observed in the manufacturing sector. From the above, it can be inferred that the growth of tertiary sector and its productivity was significant during this period, as a response to the monopolar concentration to Tokyo and the advancement of the service sector.

As for structural change in Japan's manufacturing, the economy is growing remarkably during this period, led by the machinery industry as the leading industry, with electric machinery and automobile industry at its core. While overseas activities of Japanese firms in Asia is quite active during this period as they moved mass-production facilities overseas, high economic growth was sustained owing to production activity in regional cities, as well as R&D and prototype-manufacturing in central locations.

(c) The third period: from the mid- 1990's to the present

The third period faced currently by Japan, in large part has the same structure as the second period. Net population increase is taking place only in Tokyo metropolis (figure 3-1). However, there is no notable factor that seems to be causing an active population inflow into Tokyo metropolis, as seen in the two previous periods.

Phenomena similar to the second period are taking place in changes in the industrial structure. While there is a nation-wide shift to tertiary industry, its share in Tokyo metropolis has increased to a level above 70 percent.

Meanwhile, changes from the previous period can be observed in overall productivity and the structure of the manufacturing industry. First, the decrease in overall productivity of the Tokyo metropolis is noteworthy, while no such tendency can be observed when limiting to manufacturing productivity. Taking into consideration the fact that there was a considerable shift to tertiary industry in Tokyo metropolis during the third period, one can observe that while manufacturing hollowed-out in Tokyo, remaining manufacturers maintained high productivity. The dive in productivity during this period can be attributed to the increased share of the tertiary sector in the economy, and the resulting decrease in productivity.

Next, as far as structural change in the manufacturing industry goes, there is a notable decrease in share of electric machinery which has been, up to that point, Japan's leading industry. Although the electric machinery industry has been active in increasing its overseas activities during this period, its share within the economy largely differ between the second and third periods. Although Japan's manufacturing industry has accomplished high growth through the first and second period, it is lagging noticeably in the third period. Moreover, because the tertiary sector did not experience noticeable growth during this period either, the economy as whole stagnated leading to this period being often coined as "the lost decade". For this reason, no clear correlation is seen between population inflow into to Tokyo and Japan's economic growth.

From the above, it can be argued that even though the third period shows similar tendency in inter-regional population mobility and changes in the industrial structure as the second period, the resulting productivity growth in the tertiary sector and growth of the manufacturing sector cannot be seen. In other words, while Japan as whole is becoming a service-oriented economy, it is likely that there is less synergy between information and knowledge-based activities and production activities. However, Japan is still in the third period, and it is too soon to assess the situation.

Table 3-1: Characteristics of the three cycles in the transformation of Japan's regional economic structure

	Status of population inflow into the three metropolis	Shift in industrial structure	Change in productivity	Growth of the manufacturing sector and structural change
First period	Tokyo ++	Primary --	Converging	Growth period manufacturing (except textile)
	Osaka +	Secondary ++	Tokyo -	
	Nagoya +	Tertiary +	Osaka -	
Second period	Tokyo +	Primary -	Diverging	Growth period

	Osaka - Nagoya 0	Secondary - Tertiary ++	Tokyo ++ Osaka -	centered on electric machinery
Third period	Tokyo + Osaka - Nagoya 0	Primary - Secondary - Tertiary ++	Low Tokyo --	Low growth Centered on electric machinery

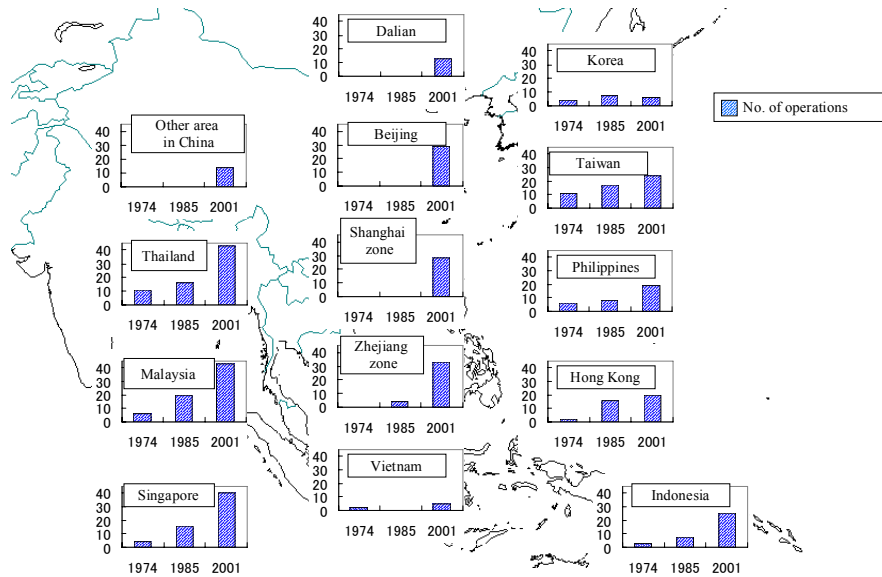
3.2. *Growth of agglomerations in East Asia and their linkage*

3.2.1. *Overseas development of Japanese firms*

The previous section examined the changes in Japan's regional economic structure. It is important to point out that these changes taking place in Japan, as the only advanced economy in the East Asian region then, has influenced the East Asian region as a whole, through for example, the overseas expansion of Japanese firms.

Figure 1.2.13 illustrates the offshore shift of five Japanese electrical and electronic machinery manufacturing majors and three auto manufacturing majors. Japanese companies seem to have directed their attention primarily toward the NIEs and the ASEAN 4 up until 1985, while recent years have seen a sharp rise in Chinese operations. However, these operations have focused on the Beijing and Shanghai economic zones, as well as the Pearl River Delta, while the concentration of operations in these areas has not exceeded that of other parts of East Asia. The offshore shift of Japanese companies has also not been into China as such—in other words, China and Chinese territory as a whole— but rather into the various agglomerations, particularly those along the Chinese coast, while their presence in these agglomerations is no greater than that of other countries. Moreover, research and development operations have not shifted as much as production operations, suggesting the development of division of labor consisting of Japanese companies conduct research and development domestically, while conducting solely production operations overseas. More detailed analyzes are done in recent research on fragmentation.

Figure 3-2 Status of offshore operations of five electrical and electronic machinery manufacturers and three automobile manufacturers



Source: Figure 3-8, Hisatake, Haratoh (2003)

As a result of these offshore expansion of Japanese firms, by 2003, Japanese manufacturing sector's accumulative FDI to ASEAN-4 has reached 2.3 trillion yen, 2.2 trillion yen to China including Hong Kong and 2.1 trillion yen to NIEs except Hong Kong (Bank of Japan "International Balance of Payment Statistics"). Looking at investment flow, in 2002, investment to ASEAN-4 reached 354 billion yen, while that to China was 259 billion yen (Ministry of Economy, Trade and Industry "Basic (Trend) Survey of Overseas Business Activities"). From these data, it can be inferred that Japan's investment to ASEAN and China is well-balanced.

East Asia's interagglomerative linkages are also deepening. While detailed discussion of these linkages is impeded by the current lack of trade and investment regional statistics, here we will consider the deepening of economic ties in the various areas of East Asia, focusing particularly on Japan. Figure 1.2.11 shows trends in container circulation volume among main Japanese and East Asian ports in the 1990s. Links appear to be strong between Hakata and Kitakyushu on one hand and the nearby Pusan, between the sister cities of Osaka and Shanghai, suggesting stronger regional links than the national ties would let one estimate. Looking at figure 1.2.12 which focuses on changes in the number of flights between major airports, the movement of people between agglomerations in East Asia and Japan appears to be growing.

Table 3-2 Changes in trade volumes of main trading ports in Japan and East Asia

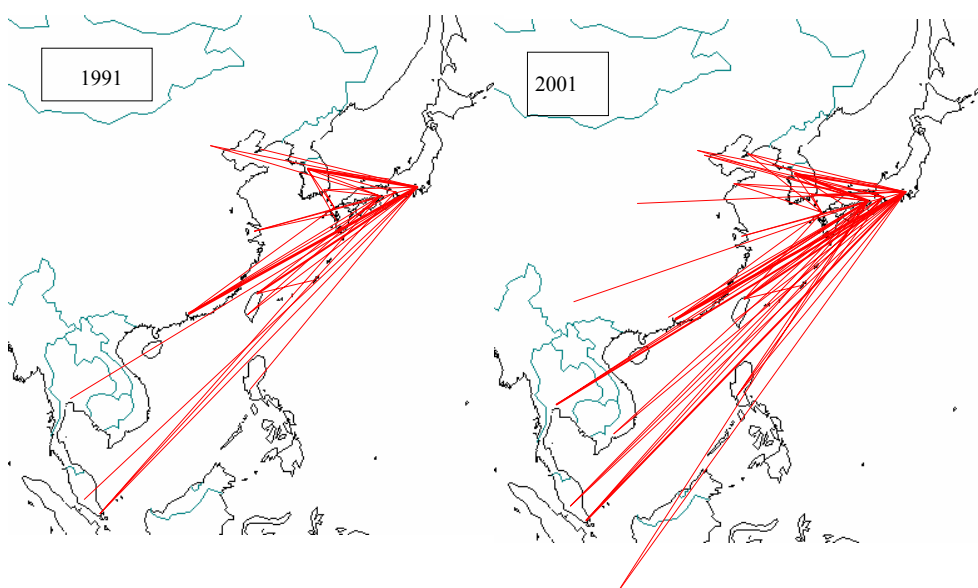
		(10,000 tons)						
		Tokyo	Yokohama	Nagoya	Osaka	Kobe	Kita-Kyushu	Fukuoka
South Korea	Pusan	3.5 → 8.5	13.3 → 5.9	5.0 → 4.7	9.5 → 6.9	11.6 → 4.8	4.9 → 3.4	0.7 → 2.6
China	Hong Kong	5.5 → 21.5	11.1 → 16	4.1 → 12.2	2.5 → 11.3	17.5 → 15.5	1.2 → 2.3	0.1 → 2.7
	Dalian	0.0 → 2.8	0.0 → 3.7	0.0 → 2.1	0.0 → 3.5	0.0 → 2.2	0.0 → 1.8	0.0 → 0.0
	Xiamen	0.0 → 0.7	0.0 → 3.1	0.0 → 1.8	0.0 → 1.6	0.0 → 1.8	0.0 → 0.9	0.0 → 0.3
	Tianjin New Port	0.0 → 0.3	2.3 → 5.8	1.3 → 4.0	0.6 → 2.1	3.9 → 4.8	0.0 → 1.1	0.0 → 0.0
	Shanghai	0.3 → 6.1	2.8 → 9.7	1.6 → 9.3	1.3 → 14.4	6.5 → 9.0	0.5 → 3.1	0.0 → 0.4
	Qingdao	0.0 → 2.8	0.0 → 3.4	0.0 → 3.7	0.0 → 3.3	0.0 → 4.1	0.0 → 0.9	0.0 → 1.0
Taiwan	Jilong	7.4 → 6.7	7.8 → 6.5	5.3 → 7.2	5.2 → 4.6	10.4 → 5.6	1.5 → 1.5	0.0 → 0.3
	Gaoxiong	4.0 → 4.3	5.9 → 3.4	2.4 → 3.2	1.8 → 3.4	6.1 → 3.4	1.1 → 1.0	0.0 → 0.2
Southeast Asia	Manila	1.1 → 2.6	1.7 → 1.8	1.4 → 3.7	0.4 → 1.0	3.9 → 2.2	0.3 → 0.9	0.0 → 0.2
	Ho Chi Minh	0.0 → 1.0	0.0 → 1.3	0.0 → 0.9	0.0 → 1.0	0.0 → 1.3	0.0 → 0.2	0.0 → 0.3
	Bangkok	2.3 → 6.8	10.5 → 4.5	4.1 → 5.6	0.6 → 3.0	8.8 → 4.1	1.7 → 2.0	0.0 → 1.1
	Singapore	7.0 → 7.6	7.8 → 5.8	3.4 → 4.1	1.4 → 3.4	8.4 → 5.7	1.1 → 0.6	0.0 → 1.0
	Penang	0.3 → 1.0	0.8 → 1.4	0.4 → 0.9	0.1 → 0.7	1.3 → 0.9	0.6 → 1.4	0.0 → 0.4
	Port Klang	1.5 → 3.0	1.1 → 2.5	1.4 → 2.9	0.3 → 2.3	3.2 → 5.5	0.4 → 0.8	0.1 → 0.5
	Laem Chabang	0.0 → 4.6	0.0 → 1.8	0.0 → 3.5	0.0 → 1.7	0.0 → 2.1	0.0 → 0.3	0.0 → 0.8
	Jakarta	1.7 → 2.9	0.8 → 1.2	2.2 → 2.9	0.3 → 3.6	3.7 → 2.3	0.1 → 0.4	0.1 → 0.4

Notes:

1. Figures represent 1989 container throughput volume → 1998 container throughput volume.
2. Shaded boxes indicate areas where the rate of increase in container throughput volume has been particularly high.

Source: Survey by Ministry of Land, Infrastructure and Transport

Figure 3-3 Expansion of flight routes between major airports in Japan and East Asia



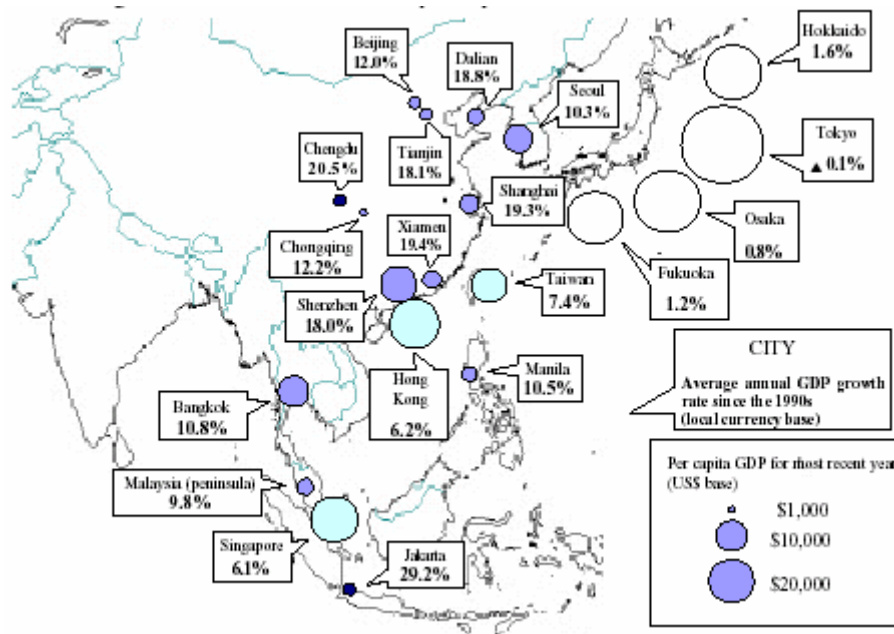
Source: Figure 3-7 from Hisatake and Haratoh (2002)

3.2.2. Growth of economic agglomeration in Japan's neighboring East Asia

The economic agglomerations in neighboring East Asia have also grown enormously in recent years. Figure 1.2.30 shows the annual average rate of growth for real GDP in key East Asian economic agglomerations in the 1990s. Almost all of these agglomerations have achieved an annual rate of growth of at least 10 percent. By comparison, the economic growth rates of Japanese economic agglomerations are extremely low. The per capita GDP indicated by circle

size in the figure reveals that Japan's economic agglomerations remain a significant economic presence.

Figure 3-4 Trends in 1990s per capita GDP in East Asia



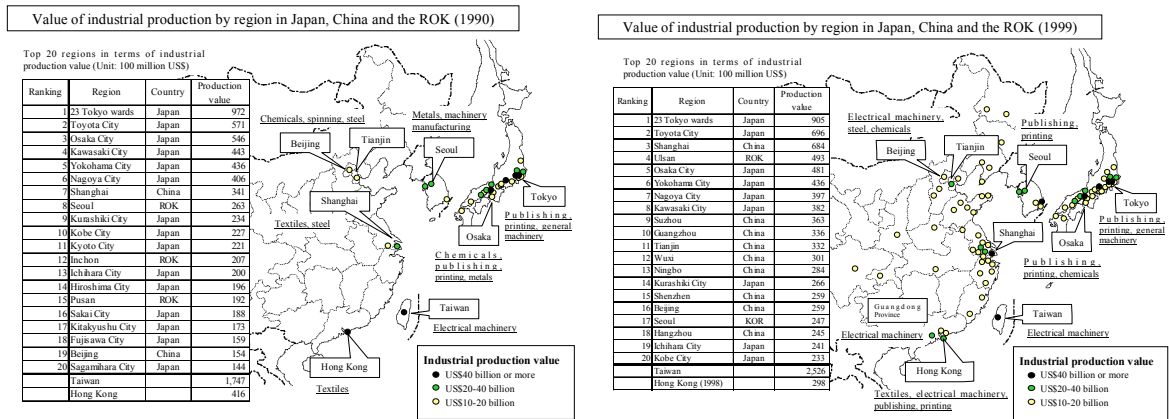
Source: Figure 3-2, Hisatake and Haratoh (2002)

3.2.3. Competition among economic agglomerations

As differentiated economic agglomerations form in East Asia, competition is also becoming increasingly intense among these agglomerations to establish themselves as hubs for production, information and knowledge activities.

Production competition in particular is heating up as East Asia becomes into “the world’s factory”. Trends in industrial production value in the various towns and regions of South Korea, China, Hong Kong, Taiwan and Japan (Fig. 1.2.9) reveal the emergence of many new industrial cities, while the cities with top production rankings are changing frequently. From the large-scale changes that took place since the 1990’s and the globalization in East Asia that ensued (progress in the movement of people, goods, money and information), it is clear that within a country or region, agglomeration is concentrated to large metropolis.

Figure 3-5 Changes in industrial production by region in Japan, China and the ROK



Note: Production value rankings are not in strict order because the geographical scope of cities has not been taken into consideration. However, a comparison can be made between 1990 and 1999, from which it would seem that many cities in East Asia are industrializing.

Source: Figure 3-3, Hisatake and Haratoh (2002)

Competition to establish and maintain information and knowledge activity hubs is also becoming fierce. Figure 1.2.10 indicates changes in the ranking of business environments in Asia-Pacific cities. The rankings created by *Fortune* are drawn up by Arthur Andersen based on the four criteria of overall business environment, the cost of doing business, the ability of the local workforce, and quality of life. As the figure shows, cities are moving very quickly in and out of the top rankings, evidence of the increasingly stiff competition environment in East Asia. Competition is also picking up in the field of finance, the epitome of global business. Tokyo, Shanghai, Hong Kong and Singapore are often identified as cities likely to become international financial centers in East Asia, but on the assumption of the “one time-zone, one global center” theory, cities may find themselves battling hard to take that position.

Table 3-3 Trends in business environment rankings of Asia-Pacific cities

	1995	1999	2000
First	Singapore	Singapore	Hong Kong
Second	Hong Kong	Sydney	Sydney
Third	Tokyo	Melbourne	Singapore
Fourth	—	Hong Kong	Auckland
Fifth	—	Taipei	Tokyo

Source: Table 3-4, Hisatake and Haratoh (2002)

Japan’s economic agglomeration is facing similar fierce competition. For example, when looking at the number of international conferences being held in Tokyo, Osaka and Kyoto, one can observe that the numbers lag behind those of other major cities in the world. (Table 3-4)

Even Singapore, reputed as a business hub, is facing intense competition. The Port of Singapore once boasted the world’s largest container handling volume thanks to the advanced services offered by its port facilities. Recently, however, companies have been shifting their trade to Tanjung Pelepas Port at the southern tip of Malaysia to take advantage of cheaper fees.

¹ In terms of attracting regional headquarters (RHQ) too, a shift is in progress to Hong Kong as a gateway to growing China. The rankings in Figure 1.2.10 indicate that Hong Kong replaced Singapore in 2000-01 as top of the list for the Asia-Pacific. In response to this threat, the Economic Review Committee, which has been examining measures to stimulate the Singaporean economy, recommended in April 2002 that the corporate tax rate be reduced.

Table 3-4 Changes in international conferences hosted by cities

	1990		1996		2000	
	Ranking	Number of conferences	Ranking	Number of conferences	Ranking	Number of conferences
Paris	1	361	1	280	1	276
Brussels	3	194	4	178	2	209
London	2	268	3	179	3	195
Vienna	4	177	2	186	4	157
Singapore	5	166	7	136	5	124
Hong Kong	18	74	10	115	29	76
Seoul	23	60	22	67	30	74
Beijing	25	53	21	71	32	55
Tokyo	16	81	24	64	33	53
Kyoto	-	-	-	21	-	21
Osaka	-	-	-	20	-	13

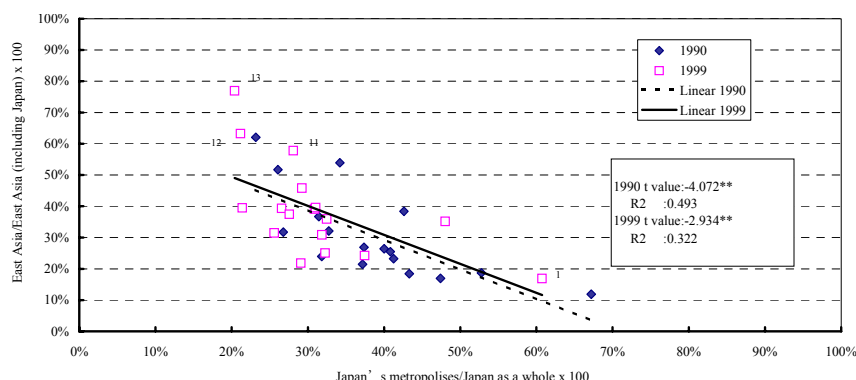
Source: Table 3-5, Hisatake, Haratoh (2002)

3.3 *Linkage between the East Asian Economy and Japan*

In the sub-section 3.1, we looked at changes in Japan's regional economic structure. In the second and third cycles, there have also been changes in the correlation with the East Asian economy. At the background are developments including the offshore expansion of Japanese firms and the formation of economic agglomeration in East Asia. Figure 3-__ indicates the relation between Japan's regional economic structure and East Asia. The manufacturing industry as a whole is divided into 17 sectors, plotting the share of East Asia in East Asia as a whole, Japan included, along the vertical axis, and the share of Japan's major metropolitan areas along the horizontal axis. In other words, the figure examines the relation between East Asia's share of East Asia as a whole in the 17 industries and the degree of agglomeration in Japan's metropolitan areas.

¹ In 2001, where Singapore Harbor handled 15.5 million containers (down 8.9 percent from the previous year), Tanjung Pelepas Port handled 2.05 million (five times the volume of the previous year)

Figure 3-6 Changes in correlation between Japan's regional economic structure and East Asia



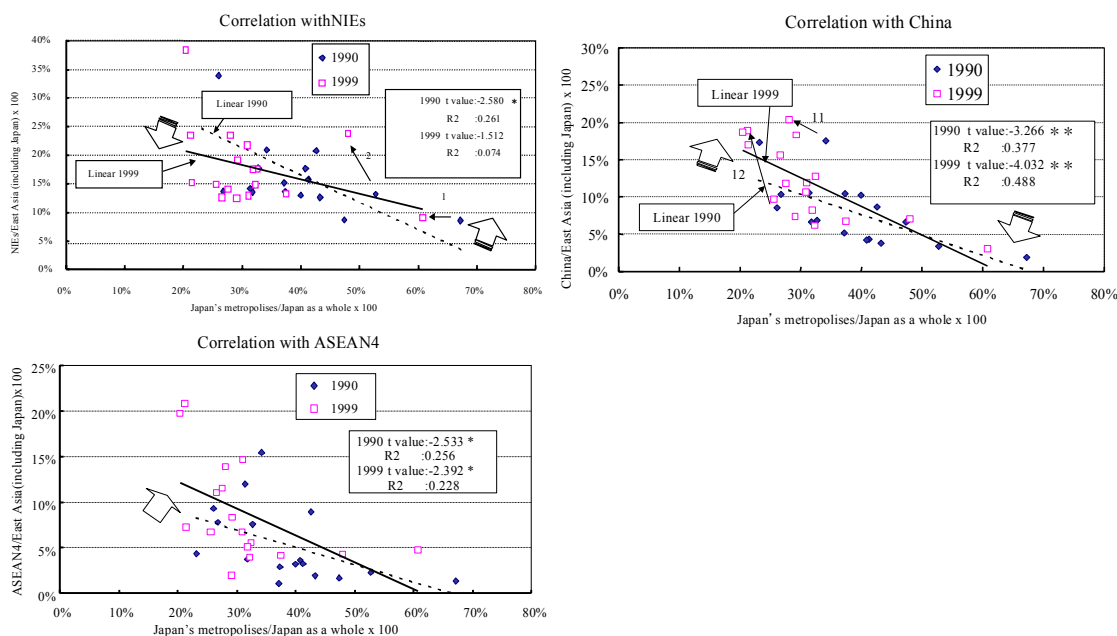
Note:
 (1) Industries represented: 1. Publishing and printing; 2. Transport machinery; 3. General machinery; 4. Electrical machinery; 5. Precision machinery; 6. Metal products; 7. Metals; 8. Chemicals; 9. Plastics; 10. Rubber products; 11. Textiles; 12. Apparel; 13. Petroleum and petroleum products; 14. Paper and paper products; 15. Foods, beverages, cigarettes; 16. Ceramics and cement products; 17. Other.
 (2) A single asterisk on the t-value indicates a 5% level of significance, a double asterisk a 1% level of significance.

Source: Figure 2-8, Hisatake, Haratoh (2002)

The result is a negative correlation tracing a downward line. The negative correlation indicates that East Asia has limited competitiveness compared to Japan in those industries agglomerating in Japan's metropolitan areas; while conversely, East Asia's competitiveness is comparatively high in those industries not agglomerating in said major cities (that is, industries located in local Japanese cities). For example, the publishing and printing industry appearing as 1 in the figure is closer to a service industry than a manufacturing industry, focusing on information and knowledge activities. Because industries of this type have low transport costs, they are strongly agglomerative, and Japan's possession of the most advanced economic structure in East Asia gives Japan an overwhelming dominance in such industries. Trends as regard to textiles, apparel, petroleum and coal products reflect the fact that while plants were originally transferred to local cities, as of the 1980s, companies also began to look beyond Japan to actively relocate their production overseas. However, this correlation becomes hard to explain in 1999 in comparison with 1990. In other words, Japan tends to have greater competitiveness than East Asia in those industries agglomerating in major Japanese cities, but as East Asian competitiveness grows, the previously clear correlation has become weak. As a result, while there is very little change in the downward trend line in Figure 1.2.23, it is beginning to shift slightly upward, making an explanation toward the correlation increasingly difficult.

Furthermore, dividing the vertical axis (East Asia) into the NIEs, ASEAN 4 and China to examine the correlation with these countries and areas, different trends appear for each of them (Figure 3-7).

Figure 3-7 Regional economic structure in Japan and changes in correlation with East Asian countries and regions



Source: Figure 2-9, Hisatake, Haratoh (2002)

In 1990, the relation between the NIEs and Japan presented a downward trend line, but by 1999, this had flattened out as result of growing NIEs competitiveness in those industries agglomerating in major Japanese cities. The improved competitiveness of East Asia in those industries seems to have been marked in the NIEs. Particularly in 1999, the explanation toward a correlation had become extremely difficult. In other words, the strong competitiveness of Japan compared to the NIEs in those industries agglomerating in major Japanese cities is beginning to erode.

In terms of the relation between ASEAN 4, China and Japan, the downward trend line of 1990 had become even steeper in 1999. This would suggest that the economic development of ASEAN 4 and China has been focused in the industries located in local Japanese cities rather than those agglomerating in metropolitan areas. In China, this correlation is considerably more marked in 1999 than in 1990. It reveals that China is developing based on the former type of industry rather than the latter. As a result, China's development would until now appear to have been centered on comparatively labor-intensive and land-intensive industries rather than on the information and knowledge-intensive industries found in Japan's metropolitan areas.

As far the relationship between industrial agglomeration in big cities, and the international division of labor between developed and developing countries is concerned, one can predict from the point of view of NEG, to see a pattern of trade specialization with Japan as the core or as a hub, a prediction consistent with the analysis provided above. The higher the degree of agglomeration of an industry in large cities of developed countries (e.g. Japan), the higher is the competitiveness of that particular industry in the developed country (e.g. Japan) vis-à-vis neighboring developing countries (East Asian countries). The level of that advantage or the

overall picture of the division of labor would then depend on the degree of development relative to the core (e.g. Japan).

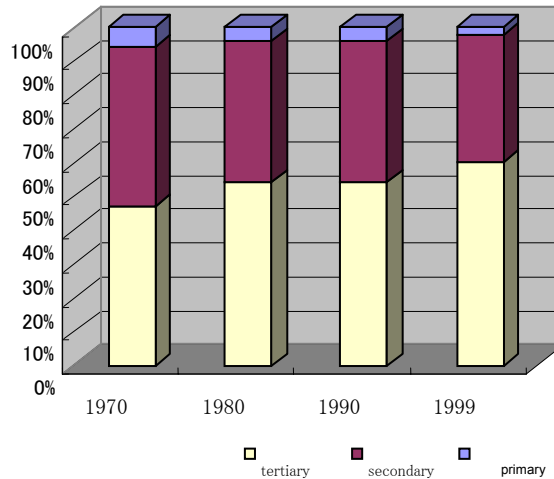
The above analysis can be confirmed when looking at the trade structure of China. Although China has trade surplus with respect to its trade with the United States, it has trade deficit with Japan, as it is importing basic parts and materials. Data for 2003 show that China's export to the U.S. was USD 92.6 billion, while it imported USD 33.9 billion; with respect to Japan, China exported 59.5 billion and imported 74.2 billion (World Trade Atlas). According to a survey conducted to Japanese corporations (Figure 1-48 in White Paper on Manufacturing Infrastructure 2004), firms foresee that local production would increase five years from now, but export from Japan would not change dramatically.

3.4 Changes and convergence of industrial structures of East Asian countries and their major cities

Let us look at the shift and eventual convergence of industrial structure of East Asia countries.¹³

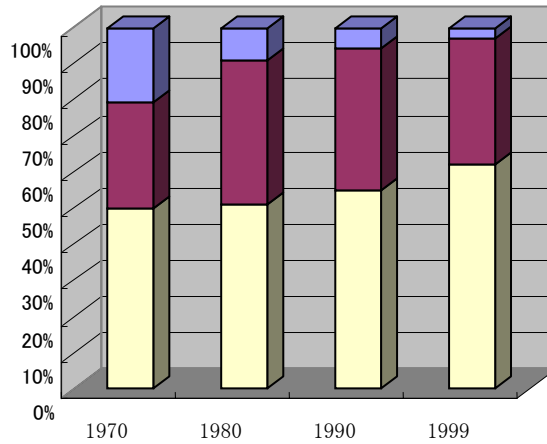
Naturally the industrial structure of Japan is most advanced with the share of the service sector above 60 percent, and an extremely small share of the primary sector. The industrial structure of the NIEs, which follow Japan, is becoming very similar to that of Japan. In both cases, one can observe that the secondary sector peaked in the past, and its share in the overall economy is decreasing.

Figure 3-8 Shift in Japan's industrial structure



Source: author, based on data from the White Paper on International Trade 2002

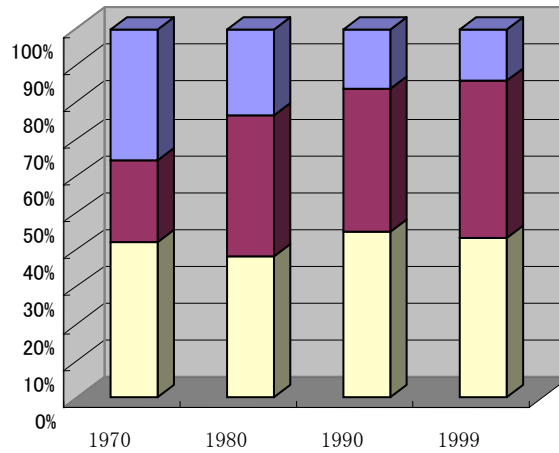
Figure 3-9 Shift in the industrial structure of the NIEs



Source: author, based on data from the White Paper on International Trade 2002

In contrast, ASEAN-3 countries are still going through industrialization by decreasing their share of the primary sector and increasing the share of the secondary sector.

Figure 3-10 Shift in industrial structure of three ASEAN countries

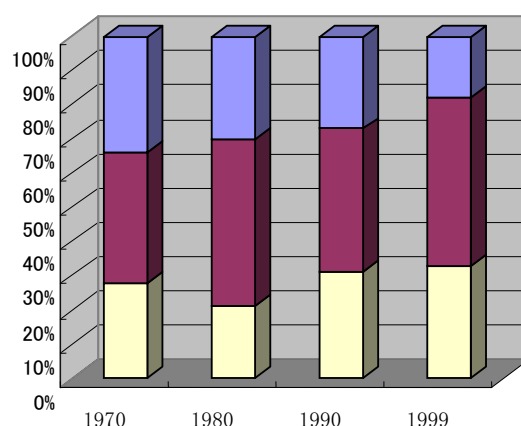


Source: author, based on data from the White Paper on International Trade 2002

China's industrial structure is similar to that of ASEAN (3) from the perspective of its large share of industry, and the lower share of the service sector compared to Japan or the NIEs, it is noteworthy to remark that industrialization has picked up since a relatively early stage. Looking into the details, the share of capital-intensive industry is high compared to countries with similar per capita GDP. This can be attributed to the fact that China went through top-down industrialization during the Cold War under the planned economy, and aimed at a full-set industrialization. Even now, State-owned Enterprises (SOEs) exist in such as heavy chemical industry and part of the machinery industry, and remain an important issue to be solved for the whole country's economic reform, as those SOEs tend to be non-competitive in an international scale. On the flip-side of the coin of this issue, is the problem associated with the non-performing loans (NPLs) of state-owned commercial banks which have been acting as the main banks to the SOEs. As far as the domestic mobility of factors of production goes, although

the movement of labor has been relatively liberalized since the start of the reform process in 1985, allowing it to move to locations with higher marginal productivity, it is not yet the case with the movement of capital. Reform of the financial sector, especially in terms of financial mediation and distribution functions, remain to be a crucial issue to be solved.

Figure 3-11 Shift in China's industrial structure



Source: author, based on data from the White Paper on International Trade 2002

This sub-section will examine in detail the issues of specialization and diversity, but before then, let us look at the shift in industrial structure of major cities in Japan, China and South Korea.

Japanese cities all have advanced structures, and among them, regional centers such as Hiroshima and Sendai, have similar structures to Tokyo, an international metropolis.

Chinese cities demonstrate a large share of secondary sector, but recently, international cities such as Beijing and Shanghai are increasing their share of the service sector. Cities that were treated as special economic zones from their early stage of development, such as Zhuhai and Guanzhou, have had a high share of the third sector, but it can be seen that cities such as Shanghai are catching up fast in terms of their shift of economy toward the service sector. In South Korea, there is a contrast between Seoul which has a similar structure to that of Tokyo on the one hand, and industrialized cities such as Ulsan on the other.

Table 3-5 Shift in industrial structure of major cities in Japan, China and South Korea

Japan	1990			2000		
	Primary industry	Secondary industry	Tertiary industry	Primary industry	Secondary industry	Tertiary industry
Tokyo City	0.09	22.16	77.75	0.05	16.55	83.40
Nagoya City	0.07	25.39	74.53	0.04	18.92	81.04
Osaka City	0.02	20.83	79.14	0.01	13.63	86.35
Yokohama City	0.13	31.02	68.85	0.09	23.41	76.50
Kawasaki City	0.06	51.04	48.91	0.05	32.70	67.25

Kobe City	0.20	31.75	68.05	0.17	24.57	75.25
Kyoto City	0.20	27.52	72.28	0.16	23.79	76.05
Sapporo City	0.14	18.71	81.15	0.07	12.46	87.47
Hiroshima City	0.23	25.86	73.92	0.17	16.54	83.29
Fukuoka City	0.32	13.59	86.09	0.14	10.53	89.33
Kitakyusyu City	0.16	29.35	70.50	0.21	37.46	62.34
Sendai City	0.17	14.17	85.67	0.32	21.53	78.15
Chiba City	0.21	16.15	83.64	0.40	27.98	71.62

China	1990			2000		
Region	Primary industry	Secondary industry	Tertiary industry	Primary industry	Secondary industry	Tertiary industry
Beijing	8.76	52.39	38.85	3.6	38.10	58.30
Tianjin	10.25	59.93	29.83	4.50	50.00	45.50
Shanghai	4.38	64.82	30.80	1.80	47.50	50.70
Chongqin	27.64	45.59	26.77	17.80	41.30	40.90
Dalian	13.17	55.28	31.55	9.50	46.60	43.90
Nanjing	10.49	59.69	29.83	5.40	48.40	46.20
Wuxi	10.93	67.11	21.96	4.00	56.90	39.10
Suzhou	17.31	60.97	21.72	5.90	56.50	37.60
Hangzhou	17.38	54.02	28.60	7.50	51.30	41.20
Ningbo	20.76	56.80	22.45	8.10	56.00	35.90
Qingdao	23.34	49.10	27.57	12.20	48.70	39.10
Guangzhou	8.05	42.65	49.30	4.00	43.40	52.60
Shenzhen	5.17	52.86	41.98	1.10	52.50	46.40
Zhuhai	18.43	39.97	41.60	4.20	55.50	40.30
Dongguan	22.69	47.35	29.96	6.30	54.90	38.80
Zhongshan	31.32	43.21	25.46	7.80	54.50	37.70

Korea	1990			2000		
Region	Primary industry	Secondary industry	Tertiary industry	Primary industry	Secondary industry	Tertiary industry
Seoul	0.64	24.43	74.93	0.53	16.59	82.87
Pusan	2.78	44.88	52.34	2.35	32.38	65.27
Inchon	1.13	66.78	32.09	1.68	57.79	40.53
Ulsan	-	-	-	0.61	83.95	15.44

Source: Annual report on prefectural accounts, China Urban Statistical Yearbook, Korea statistical yearbook

4. Specialization trends of selected regions

4.1 Degree of specialization as measure by the Krugman index

Let us look at the degree of specialization of East Asian countries using the Krugman specialization index. The Krugman index measures the degree of specialization by comparing a country's industrial structure with the average value of other countries. If the structure is similar to the average of other countries, the index takes the value of zero, will it takes the value of 2 if the structure is completely different. The higher the value, the higher is the relative degree of specialization.

Table 4-1 Degree of specialization using the Krugman index

K-spec	1990	2000	
Japan	0.4379	0.3585	▲ 0.0794
China	0.4800	0.4079	▲ 0.0722
ROK	0.2137	0.2029	▲ 0.0108
HKSD	0.7770	0.7064	▲ 0.0706
Taiwan	0.3156	0.5189	0.2032
Singapore	0.6312	0.7750	0.1438
Indonesia	0.7074	0.6202	▲ 0.0872
Malaysia	0.5541	0.6622	0.1081
The Philippines	0.9045	0.9224	0.0179
Thailand	0.8313	0.5517	▲ 0.2796

Data source:

International Yearbook of Industrial Statistics (UNIDO) 1995-2004; IMFonline;

Taiwan data for the year 2000 collected from <http://www.dgbas.gov.tw/dgbas03/introdu.htm>, IFS Online Service was referred to for the exchange rate

Data for the Philippines for the year 2000 was collected from Philippine Statistical Yearbook(2003); IFS Online Service was referred to for the exchange rate

It can be said that the more advanced the region, the lower the level of specialization.

Whereas the degree of specialization is decreasing in China, regions that are facing direct competition from Mainland China, i.e. Taiwan, Malaysia, Singapore and other ASEAN countries, the degree of specialization is increasing.

4.2 International and intercity comparison of specialization and diversification

4.2.1 Japan

What is the recent status of Japan's diversity, specialization and competition, factors emphasized by the theory of internally-generated economic growth, and their relevance for the growth of the city? This sub-item will present the changes in Japan's regional economic

structure from the point of view of internally-generated growth theory.¹⁴

First, one needs to grasp the geographical distribution of economic activities. In the analysis below, urban areas consisting of cities, wards, town and villages, will be determined based on the commuting pattern.¹⁵ Using this methodology, Japan will be divided into 118 urban areas. Next the industries consisting of manufacturing, distribution, restaurants and service industries will be classified into 332 categories of businesses. Using employment data on these 118 urban areas and 332 business categories, the degree of diversity, specialization and competition will be indexed for 1981 onwards, and their relevance for the increase/decrease in employment will be discussed.

As for the calculation of specialization, and diversity indices, data for 1981, 1991 and 1999 were obtained from the employment statistics of the Ministry of General Affairs (Establishment and Enterprise Census) and processed as follows.

- 1) The industrial classification was done using the 332 sub-classification under i. manufacturing, ii. Wholesale and retail trade, eating and drinking places, and iii. Services (<http://www.stat.go.jp/english/data/jigyoku/2001/bunrui.htm>)
- 2) Japan's cities, wards, townships and villages were classified into 118 economic areas according to "Criterion for establishing Japan's urban areas", Kanemoto (2001) for 1995 (<http://www.e.u-tokyo.ac.jp/~kanemoto/MEA/mea.htm>)
- 3) Data collected according to 1) and 2) above were processed using the formula i) and ii) below to calculate the degree of specialization, and diversity.
- 4) The formulas used are as follows.

i : industry (332 sub-classifications)、 r : region (118 areas)、 y : employment (number of employee)

i) Specialization

$$RS_r = \max_i LQ_{ir}$$

$$LQ_{ir} = \frac{S_{ir}}{\sum_r y_{ir} / \sum_i \sum_r y_{ir}} \quad S_{ir} = \frac{y_{ir}}{\sum_i y_{ir}}$$

ii) Relative Diversity

$$RD_r = \frac{1}{\sum_i |S_{ir} - S_i|} \quad \text{where } S_i \text{ is the share of the } i^{\text{th}} \text{ industry relative to all industries}$$

Finally, the definitions of i) and ii) above are based on Overman, Redding and Venables(2001)、 Duranton and Puga(2000).

As mentioned in section 2 of this paper, the high level of diversity implies high potential for agglomeration that promotes knowledge propagation among different firms and different

categories of business, and are basic conditions for innovation. As mentioned in the example of Manchester and Birmingham, it can be argued that it is easier to maintain sustainable growth through changes in industrial structure, when an agglomeration is more diversified than is specialized in one particular industry.

The following characteristics appear from examining the three indices of specialization, diversity and competition.

In Japanese economic agglomerations, the larger is the city, the higher is the level of diversity, and this characteristic has an upward trend. In particular, the Tokyo-area has a high degree of diversity, while its level of specialization is lowest. Osaka has a comparable level of diversity. Detailed observations follow:

First, urban areas in Japan that are diverse, are generally speaking large cities, and their degree of diversity is stable over time.

Metropolis with a high degree of diversity are in many cases are core cities that are typically capitals of prefectures. This is because prefectural capitals with administrative functions tend to have a broad industrial structure. For example, the 10 most diverse metropolises are in both 1989 and 1999, metropolises that include prefectural capital. Looking from the opposite side, the eight least specialized metropolises for both years include prefectural capital.

Table 4-2 Specialization and diversity in Japan

ranking	Specialization				Diversity			
	1981		1999		1981		1999	
1	Kure metropolis	330.51	Isahaya metropolis	810.10	Tokyo metropolis	4.07	Osaka metropolis	4.63
2	Odawara metropolis	279.75	Kure metropolis	425.87	Osaka metropolis	3.72	Tokyo metropolis	4.44
3	Iwakuni metropolis	247.07	Sakata metropolis	235.56	Nagoya metropolis	3.18	Nagoya metropolis	3.82
4	Takasaki metropolis	222.04	Hekinan metropolis	204.79	Okayama metropolis	2.64	Okayama metropolis	3.54
5	Hirosaki metropolis	133.82	Tomakomai metropolis	174.66	Kobe metropolis	2.53	Hiroshima metropolis	3.36
6	Aizuwakamatsu metropo	126.85	Gamagori metropolis	150.92	Hiroshima metropolis	2.51	Kobe metropolis	3.21
7	Hekinan metropolis	123.62	Takasaki metropolis	137.19	Utsunomiya metropolis	2.48	Kanazawa metropolis	3.08
8	Fukui metropolis	104.85	Aizuwakamatsu metropo	136.94	Niigata metropolis	2.43	Sendai metropolis	3.07
9	Gamagori metropolis	99.64	Kisarazu metropolis	121.15	Kanazawa metropolis	2.40	Utsunomiya metropolis	2.91
10	Tukuba metropolis	98.50	Fukui metropolis	111.58	Maebashi metropolis	2.36	Niigata metropolis	2.91
11	Kariya metropolis	74.62	Muroran metropolis	97.62	Takamatsu metropolis	2.25	Maebashi metropolis	2.89
12	Takamatsu metropolis	71.50	Kariya metropolis	82.65	Sendai metropolis	2.24	Fukuoka metropolis	2.89
13	Kanazawa metropolis	70.81	Takamatsu metropolis	80.54	Fukuoka metropolis	2.24	Kumamoto metropolis	2.74
14	Nobeoka metropolis	68.10	Nobeoka metropolis	78.45	Takasaki metropolis	2.23	Kyoto metropolis	2.69
15	Niihama metropolis	62.93	Hamamatsu metropolis	76.30	Kyoto metropolis	2.16	Sizuoka metropolis	2.67
16	Hitachi metropolis	61.25	Nagasaki metropolis	74.47	Kitakyushu metropolis	2.13	Takamatsu metropolis	2.67
17	Hamamatsu metropolis	55.98	Niihama metropolis	69.61	Sizuoka metropolis	2.11	Mito metropolis	2.66
18	Isahaya metropolis	55.57	Himeji metropolis	66.89	Yamagata metropolis	2.11	Kitakyushu metropolis	2.64
19	Fuji metropolis	51.53	Hiroshima metropolis	64.03	Toyama metropolis	2.10	Takasaki metropolis	2.59
20	Joetsu metropolis	51.52	Gyoda metropolis	63.52	Mito metropolis	2.09	Toyama metropolis	2.51
111	Tsu metropolis	6.90	Kagoshima metropolis	6.50	Gyoda metropolis	1.17	Sanjo metropolis	1.29
112	Nagano metropolis	6.27	Fukuoka metropolis	6.43	Gamagori metropolis	1.15	Ohda metropolis	1.23
113	Hiroshima metropolis	5.76	Sapporo metropolis	5.65	Okinawa metropolis	1.12	Gamagori metropolis	1.20
114	Sapporo metropolis	5.59	Sendai metropolis	5.26	Nishio metropolis	1.11	Nishio metropolis	1.18
115	Fukuoka metropolis	5.06	Osaka metropolis	4.58	Hekinan metropolis	1.09	Anjo metropolis	1.17
116	Niigata metropolis	4.78	Naha metropolis	4.55	Anjo metropolis	1.01	Kariya metropolis	1.14
117	Osaka metropolis	3.99	Kumamoto metropolis	3.84	Kariya metropolis	0.99	Hekinan metropolis	1.12
118	Tokyo metropolis	3.25	Tokyo metropolis	2.84	Toyota metropolis	0.99	Toyota metropolis	1.09

Source: Hisatake, Haratoh (2002), table 2-11

Second, for almost all metropolises in Japan, the degree of diversity increases with time.

This suggests that in Japanese metropolises, there is a stronger tendency for the industrial structure to diversify, than for a particular industry to develop rapidly.

Third, metropolises with a high degree of specialization tend to form enterprise castle towns, such as Kure metropolis (ship-building) and Nobeoka metropolis (chemical).

Fourth, there are areas such as Hiroshima metropolis and Takamatsu metropolis, where indices for both specialization and diversity are high, confirming the possibility of their coexistence in the same location as Duranton and Puga point out.

4.2.2 *Specialization and diversity in East Asia's economic agglomerations*

Next the correlation between the diversity based on the growth of the city and the theory of internally generated growth, and specialization will be discussed. The setting of metropolises and classification of industries is crucial to understand this correlation. Unlike the situation in the U.S. where data on Consolidated Metropolitan Statistical Areas (CMSA) or Core Based Statistical Area (CBSA) exist, or Japan as seen in the previous sub-section, it is difficult to carry out accurate empirical analysis on other East Asian countries and regions. With this understanding, this sub-section will try to provide a general analysis on the situation in South Korea and China. For South Korea, calculation of gross production value will be conducted based on 16 areas including Seoul and Pusan, and 75 industrial sub-classifications of industry and mining. For Malaysia and China, similar calculations will be conducted using 15 state and 139 industry classification for Malaysia, and province-based data of 25 economic zones and 40 industries and mining classification for China. The results of these calculations are shown in tables 4-3 to 4-5. For South Korea, one can observe that for the capital Seoul and the second largest and port city of Pusan, the level of specialization increased during the decade of the 1990's, while the level of diversification is decreasing. Because the available data does not include the service sector, it is possible that while within manufacturing there is a trend of specialization, there is an overall diversification that includes the service sector. A similar trend can be observed in Malaysia overall with the level of specialization increasing and a decreasing degree of diversity (table 4-4). In Kuala Lumpur, the capital, the level of specialization increased from 4.99 in 1990 to 12.95 in 1999, while the degree of diversification remained unchanged at 1.24 during the same period. When looking at industrial cities of Selangor, Johor and Penang, one sees that in all of them, the degree of specialization is increasing, while the level of diversity does not increase. From these observations, it can be thought that Malaysia is achieving economic growth through specialization in its industry.

Meanwhile in China, there are economic zones such as those around Shanghai and Beijing-Tianjin that are achieving economic growth while maintaining a certain degree of diversity. However, because the level of diversity is in a diminishing trend, and the degree of specialization is increasing, one can make the observation that the driving force of growth is the introduction of foreign direct investment into mature industries. Because of the limited availability of data, China with its vast surface area is divided into only 25 economic zones; it is entirely disassociated with commuting zones. However, because generally speaking, the fewer the number of geographical zones (hence increasing the number of each zone), the more likely it is for the degree of diversity to increase, it can easily be inferred that in China the level of benefit extracted from diversity is low. In view of the likelihood that the regional relationship in East Asia will deepen further in the future, it would be important for Japan to build attractive economic agglomerations focusing on the benefit of diversification, and strive for establishing

flexible collaborative relationship with other economic agglomerations in East Asia.

Table 4-3 Specialization and diversity in South Korea

	Specialization				Diversity			
	1990		2000		1990		2000	
1	Kangwon	24.04	Kangwon	63.16	Kyonggi	1.89	Chungnam	2.01
2	Gwangju	15.43	Cheju	23.69	Inchon	1.62	Kyonggi	1.84
3	Taejong	12.54	Taejong	18.70	Kyongnam	1.44	Inchon	1.69
4	Chungnam	12.10	Seoul	15.42	Pusan	1.41	Pusan	1.27
5	Cheju	12.06	Gwangju	14.00	Chungnam	1.32	Kyongnam	1.27
6	Seoul	9.19	Pusan	12.94	Seoul	1.20	Chungbuk	1.22
7	Pusan	9.14	Taegu	11.51	Kyongbuk	1.19	Chongbuk	1.14
8	Chongbuck	7.80	Kyongnam	8.37	Chungbuk	1.16	Kyongbuk	1.09
9	Taegu	7.29	Inchon	7.20	Taejong	1.03	Taegu	0.97
10	Chongnam	7.06	Kyongbuk	6.27	Taegu	1.00	Taejon	0.94
11	Chunbuck	6.38	Chongnam	5.17	Chongbuk	0.93	Gwangju	0.93
12	Inchon	4.99	Chongbuk	5.07	Gwangju	0.86	Seoul	0.90
13	Kyongbuk	4.87	Ulsan	4.28	Chongnam	0.78	Ulsan	0.90
14	Kyongnam	4.65	Chungbuk	3.86	Kangwon	0.77	Chongnam	0.79
15	Kyonggi	2.68	Chungnam	2.87	Cheju	0.73	Kangwon	0.76
16			Kyonggi	2.76			Cheju	0.66

Source: Hisatake, Haratoh (2002), table 3-12

Table 4-4 Specialization and diversity in Malaysia

	Specialization				Diversity			
	1990		1999		1990		1999	
1	Perlis	39.55	Kelantan	54.19	Perak	1.94	Johor	1.95
2	Labuan	25.89	Perlis	51.32	Selangor	1.85	Perak	1.85
3	Terengganu	13.10	Terengganu	38.85	Johor	1.84	Selangor	1.77
4	Negeri Sembilan	11.33	Pahang	14.94	Penang	1.74	Sarawak	1.58
5	Kelantan	11.33	Kuala Lumpur	12.95	Sarawak	1.58	Sabah	1.45
6	Pahang	11.12	Penang	11.82	Melaka	1.42	Negeri Sembilan	1.42
7	Kedah	8.10	Melaka	11.18	Kedah	1.31	Penang	1.41
8	Johor	6.36	Kedah	10.36	Sabah	1.26	Kuala Lumpur	1.24
9	Penang	6.24	Labuan	9.22	Negeri Sembilan	1.25	Melaka	1.15
10	Sarawak	5.55	Negeri Sembilan	8.96	Kuala Lumpur	1.24	Kedah	1.13
11	Melaka	5.12	Johor	7.12	Kelantan	1.12	Pahang	0.99
12	Kuala Lumpur	4.99	Perak	6.72	Pahang	1.02	Labuan	0.78
13	Perak	4.73	Selangor	4.85	Terengganu	0.85	Terengganu	0.78
14	Sabah	4.26	Sabah	3.70	Labuan	0.74	Kelantan	0.73
15	Selangor	4.00	Sarawak	2.75	Perlis	0.66	Perlis	0.58

Source: Hisatake, Haratoh (2002), table 3-13

The overall trend in China is similar to those of South Korea and Malaysia (table 4-5). However when looking at the Shanghai economic zone, there isn't any dramatic change as the degree of specialization increased from 1.91 in 1993 to 2.09 in 1999, while the level of diversity decreased from 3.29 in 1993 to 3.10 in 1999. It can be thought that the Shanghai economic zone is maintaining economic growth while maintaining its degree of diversity to a certain extent. Moreover, large economic zones such as Shanghai and Beijing-Tianjin have high degrees of diversity, confirming a similar trend as in Japan where the larger the agglomeration, the higher is the degree of diversity. However, because the level of diversity is not increasing as obviously

as is the case in Japan and the degree of specialization is on the rise, it is more likely that these agglomerations are achieving economic growth through the specialization of their industry.

Table 4-5 Specialization and diversity in China

	Specialization				Diversity			
	1993		2000		1993		2000	
1	Tibet	44.76	Tibet	113.50	Beijing-Tianjin economic zone	3.75	Shanghai economic zone	3.10
2	Shanxi	40.64	Guangxi-Hainan economic zone	24.74	Anhui	3.34	Beijing-Tianjin economic zone	2.78
3	Xinjiang	34.52	Yunnan	20.92	Shanghai economic zone	3.29	Hubei	2.45
4	Yunnan	16.52	Shanxi	18.68	Shandong	2.86	Shandong	2.41
5	Nei Menggu	12.40	Jilin	13.65	Henan	2.75	Anhui	2.36
6	Heilongjiang	11.24	Nei Menggu	13.33	Hubei	2.69	Liaoning	2.16
7	Shanxi	10.41	Heilongjiang	12.74	Hunan	2.66	Fujian	2.07
8	Liaoning	10.38	Xinjiang	9.51	Jiangxi	2.53	Henan	2.02
9	Gansu	7.37	Guizhou	8.46	Nei Menggu	1.92	Hunan	2.00
10	Jilin	7.14	Qinghai	8.44	Liaoning	1.86	Shanxi	1.94
11	Jiangxi	6.64	Ningxia	6.04	Fujian	1.83	Guangdong	1.89
12	Guizhou	6.04	Gansu	6.02	Guangdong	1.78	Jiangxi	1.82
13	Qinghai	5.52	Hunan	4.95	Guangxi-Hainan economic zone	1.66	Sichuan economic zone	1.75
14	Fujian	5.30	Henan	4.33	Jilin	1.60	Guangxi-Hainan economic zone	1.47
15	Henan	4.94	Liaoning	4.00	Sichuan economic zone	1.53	Gansu	1.27
16	Ningxia	4.80	Shanxi	3.95	Guizhou	1.51	Shanxi	1.23
17	Guangxi-Hainan economic zone	3.29	Fujian	3.92	Gansu	1.44	Jilin	1.19
18	Guangdong	3.19	Anhui	3.88	Shanxi	1.35	Nei Menggu	1.17
19	Hunan	3.07	Beijing-Tianjin economic zone	3.58	Ningxia	1.33	Ningxia	1.13
20	Beijing-Tianjin economic zone	2.85	Shandong	3.36	Heilongjiang	1.30	Guizhou	1.10
21	Sichuan economic zone	2.84	Jiangxi	3.17	Qinghai	1.29	Xinjiang	1.07
22	Hubei	2.46	Hubei	2.91	Yunnan	1.27	Yunnan	1.00
23	Anhui	2.14	Sichuan economic zone	2.76	Xinjiang	1.23	Heilongjiang	0.99
24	Shandong	1.98	Guangdong	2.60	Shanxi	1.13	Qinghai	0.82
25	Shanghai economic zone	1.91	Shanghai economic zone	2.09	Tibet	0.76	Tibet	0.69

Source: Hisatake, Haratoh (2002), table 3-14

The above is status of specialization and diversity of the selected three countries of East Asia. The observed trends are contrasting to the situation in Japan. In Japan, core cities all have a high degree of diversity and with an increasing trend, but in the three East Asian countries; the level of specialization is on the rise. This means that whereas Japan has the necessary foundations to take advantage of the benefit of diversity, but that foundation is weak in East Asia, and their source of growth is by taking advantage of the benefit of specialization.

This report has so far tackled present issues that cannot be adequately explained by traditional international economics, by taking notice of the power of agglomeration that is generated internally within regions, and their self-organization, and by using economic agglomeration as unit of analysis. The conclusions that can be drawn from the analysis are: 1) although Japan's economic agglomerations have extremely high potentials for growth, they are not fully exploited leading to economic slump; 2) there is a close interrelation between economic agglomerations in Japan and the rest of East Asia; 3) Japanese economic agglomerations are in advantageous positions because of their vicinity to the growing East Asian region, and because of their advanced level of development.

In view of the likely possibility that the relevance of national borders as barrier to trade and investment will diminish in the future with the progress in the WTO process and FTA negotiations, it will be increasingly important to maintain competitiveness not only at the national level, but also at the level of economic agglomeration, and also pay attention to inter-agglomeration collaboration. In Japan, it would be imperative to create attractive economic agglomerations, and seek flexible collaborative relationships with economic agglomerations in the rest of East Asia.

5. Conclusion and prospects for future studies

In this paper, the author attempted at conducting a unified analysis of the changes in regional economic systems in post-war Japan, and of the recent developments in international regional economic systems in East Asia, from the point of view the “new geographical economics”.

The central notion of the “new geographical economics” is the notion of “economics of agglomeration” that are internally generated through the interaction of economies of scale and the cost of transport (in the broader sense). The economics of agglomeration create a lock-in effect around the location of the agglomeration, and the regional economic system becomes a spacial structure with a strong inertia. However, this strong inertia of the regional economic system does not negate long-term structural transformation. As show in multiple examples in this paper, in the long term, economic agglomerations continue to transform itself through a series of structural change at all levels of the spacial structure. This transformation of the spacial structure is path-dependent, reflecting the lock-in effect of existing agglomerations, and as such the initial conditions of the agglomeration influence the future shape of the spacial structure. However, any relatively unified regional economy as whole tends to self-organize a multi-layered spacial structure with one or more “core economy” as the top layer. Generally speaking, this multi-layered system has a fractal structure, and similar structure, especially of the core-periphery-type, are observed in many partial space. Of course, in an even longer term, it is possible that the structural change keep on going as new cores or sub-cores appear in what were formerly the peripheries.

As seen in section 3.1, the transformation of Japan’s regional structure sine the end of the war depends heavily on the fact that the formation of the structure started 140 years ago with the Meiji restoration with a “double-lens reflex”-type of structure consisting of Tokyo and Osaka. Inheriting the “double-lens reflex” foundation from the pre-war times, Japan went through a period of high growth in the 1950’s and 1960’s centered on large scale and mass-producing assembly-type industries, which created the large metropolises of Osaka, Nagoya and Tokyo, followed by the creation of the Pacific industrial belt. However since the 1970’s, the globalization of world economy, the intensification of international competition and the rapid progress of information and communication technologies shifted the center of Japanese economy to creative activities that are information and knowledge intensive. This led to the largest existing metropolis, Tokyo, to have even more agglomerative power, and led to the present monopolar regional structure centered on Tokyo.

Likewise, the present space structure of East Asia as an international regional economic system, is heavily subjected to the historical fact that up to the 1960’s, Japan was the sole advanced industrialized country in Asia. Since the end of the 1960’s, the East Asian economy as a whole has been developing rapidly in a so-called “flying geese” fashion with Japan as the core economy which transferred industry elsewhere. However, as demonstrated in sub-sections 3.2, 3.3 and then in 4, even now when Asian NIEs, ASEAN and China after the reform have gone through rapid economic growth since the latter half of the 1980’s, the regional economic system of East Asia as whole still is centered on Japan as its monopole, with Japan still maintaining a strong agglomerative power as East Asia’s core economy.

That said, because the manufacturing sector of other parts of East Asia is experiencing growth, and is demonstrating its ability to manifest economies of agglomeration, there is a

non-negligible change taking place in East Asia's regional space structure. The following three scenarios can be raised as prototypes of the possible changes in East Asia's regional structure in a relatively long-term.

- Scenario A: Maintenance of a monopolar structure centered on Japan
- Scenario B: An East Asian regional economy with multiple cores with Japan as one of the major core economies.
- Scenario C: Similar to Scenario B, but with Japan as a sub-core economy

First, scenario A is one that supposes that Japan will maintain a dominant position as the sole core-economy in East Asia, similar to the current position of Tokyo within Japan. For this scenario to realize in the future when globalization should be at an even more advanced stage, the Japanese economy has to continue to grow as a world-class core-economy with agglomerative power on par with that of the United States whose influence will probably increase further. Japan will need to go through a radical transformation of its social system, going beyond mere regulatory reform, while making the most of its characteristics. In concrete terms, Japan would need to go through a real internationalization whereby for example, at least a third of professors and researchers and graduate students at major universities are from abroad, with the remaining two thirds from Japan but half of whom are constantly abroad. At the same time, radical reforms need to take place from political, social and economic perspectives. It is only then that Japan can be an international hub of a global network of information and knowledge creation, and scenario A would become a reality.

Scenario B which has more chance of being realized, represents a case where Japan will maintain agglomerative power in East Asia, equivalent to that of the East Coast (from Boston to Washington DC where industrialization first took place) of the United States at present, within that country. Finally, the possibility of scenario C cannot be thrown away either. In any case, only history will tell which path Japan will choose and challenge for its realization.

As a final conclusion, an overview of the result of the analyses on this paper will be presented together with a message in connection with foreign exchange adjustments in East Asia.

First, per capita GDP across countries, while they are converging, still have a large disparity. While Japan and the NIEs are advanced countries or in their neighborhood, the majority of ASEAN countries and China are still developing countries.

Second, the industrial structures also show that Japan and the NIEs have entered the stage of service economy, whereas industrialization has not yet peaked out in ASEAN countries and China.

Third, in examining the relationship between the level of agglomeration of economic activities into large metropolises, and the pattern of international division of labor between Japan and the rest of East Asia, while the relationship between Japan and the NIEs is becoming less clear, ASEAN and China demonstrated a pattern of specialization with Japan as the core

economy.

Fourth, after calculating the actual level of specialization, at a country-level, whereas the degree of specialization is decreasing in China, regions that are facing direct competition from Mainland China, i.e. Taiwan, Malaysia, Singapore and other ASEAN countries, the degree of specialization is increasing.

Fifth, at the city or regional levels, every major city and region other than Japan show a strong tendency toward specialization. This is likely to be because those regions are in the process of convergence as they catch up to developed economies, and as such, are taking advantage of the merits of agglomeration and specializing in fields where they are most competent. In the European Union, an increase in the level of specialization was observed at the regional level as the process of integration advanced, but this phenomenon in East Asia is probably of a different nature as the element of horizontal trade is small in East Asia.

Although it is not the objective of this paper, a comment on the issue of foreign exchange adjustment will be provided based on the findings of this paper. First, a large scale change in the foreign exchange regime is not preferable, and if an event is foreseeable based on existing imbalances, there is probably no divergence in opinion in arguing for the importance to solve it. However, the question is what can be said beyond that. To answer that question, the conditions for an optimal currency area, one of the basic notions when arguing about foreign exchange adjustments, will be raised in their relation to the findings of this paper.

The following six criteria are raised for an optimal currency area (Kawai (1997)): a) integration of the goods market; b) integration of the market for factors of production; c) symmetry of economic structure and real economy shock; d) integration of the financial market; e) similarity in the selection in the trade-off between inflation and growth-rate; f) macroeconomic policy coordination. If anything can be said from the point of view of the findings of this paper, it will be with respect to a) integration of goods market and c) symmetry of economic structure and real economic shock. However, in either case, the comments are not based on concrete quantitative analysis to evaluate the prospect of an optimal currency area, and more of an impression. First, with respect to a) integration of goods market, the deepening of the division of labor seems to indicate that integration has progressed substantially. Second, with respect c) symmetry of economic structure and real economic shock¹⁶, it is possible to give an affirmative nod in consideration of the fact that the countries commonly show a tendency of specialization, when looking at particular cities and regions' tendency for specialization, the situation might be more complicated. For example, there are flexible collaborative relationships between regions that specialize in specific areas be they the automobile industry or the electronics industry. These regional economic activities will hold important positions within the respective countries, and at the same time, the final destination of the product is more than often the United States. Actually for Japan, as shown in table 1-70 of the White Paper on Manufacturing 2004, recently published by the Japanese government, there is strong dependency to the U.S. market for luxury high-margin profitable goods, whereas markets in ASEAN and China are for the most part low profit-generating. This would imply that these regions and the countries that comprise these regions will be at the mercy of US business climate, simultaneously and to a similar extent.

One can easily predict that integration will proceed in the financial market¹⁷ as well in the market for factors of production. Whether these integration processes will increase the necessity

of foreign exchange stability within the East Asian region would depend heavily on the changes in the level of specialization and diversity of the regions, and whether the demand for the outputs be generated from within the region.

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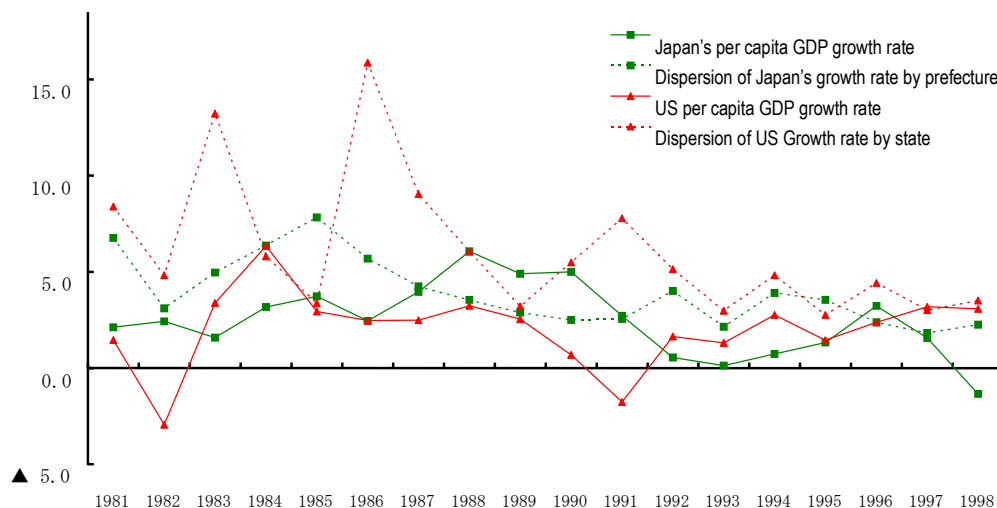
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Endnotes

- ¹ However, the share of each item is decreasing only in the ten years after 1990. At the background is the rapid economic growth of China.
- ² The competitive equilibrium referred to here is one in which every player of the economy act on the assumption that goods prices are given for all goods, that is based on a behavior of price-taker. For more detailed explanation on this theorem, please refer to Starret (1978) or Fujita (1996)
- ³ Therefore, this kind of agglomeration based on pecuniary externality cannot be generated in traditional neo-classical model, or industrial input-output analysis models based on Leontif's IO Technology. One would then need an imperfect competitive model with either a monopolistic competition or oligopolistic competition. For further details, refer to Thisse(1996).
- ⁴ Figure 4-1 in Seki (1993) was referred to in building this figure. However, whereas the latter figure is a conceptual drawing of agglomeration structure based on production technology, figure 2-4 explains the agglomeration structure of production activities.
- ⁵ For example the role of Stanford is often emphasized during the early stages of agglomeration of electronics industry (especially semiconductors) in Silicon Valley (Saxenian[1994]. However, it can easily be imagined that the West Coast (especially California) as the US's last frontier economy comprised in the early 1950's, other attractive locations similar to Silicon Valley, which could have self-organized new industrial structures. Among those places, Stanford University, especially the presence of its Vice-President, Frederik Terman, played a catalytic role in giving Silicon Valley the initial advantage. If this argument is correct, then, had Frederek Terma been at a different university in locations other than the West Coast, it would have difficult for a "Silicon Valley" to develop there.
- ⁶ This point is similar to the lock-in effect on individual firm's growth and decline. In fact, although firms are agglomeration of activities and resources into one managed entity, and the space structure discussed here an agglomeration of multiple firms' activities and resource, there are many commonalities between the two.
- ⁷ For example, refer to Seki (1993, 1997), White Paper on Small- and Medium-Sized Enterprises (1995), and Uchida (1996)
- ⁸ The above does not go beyond working hypothesis that regional geographic economic systems where economies of agglomeration play an important role, constitute a complex-system. More strict verifications of these hypotheses are remaining research issues for the future. For theoretical research on regional economic systems from the perspective of complex systems, refer to Fujita (1996) and Fujita, Krugman and Venables (1998).
- ⁹ For example, economic growth during the frontier period of 19th century U.S., was achieved by the "massive mobilization" of new land and immigrants. Refer to Taylor (Taylor) for more general discussions.
- ¹⁰ This impact of the decrease of transportation cost on the spacial structure, is not one-way, and is more complex than can be intuitively imagined. To make things easy, let us first assume that this cost of transportation is extremely expensive (that is close to infinity). Then if there are activities like agriculture which is closely tied to land (or for example, if the movement of persons is limited by national borders), then activities that make relatively less use of land such as manufacturing or service, have to disperse in accordance with the location of activities tied to land. In this case, either economies of scale nor economies of agglomeration are generated.
- ¹¹ For a theoretical explanation of this "leapfrogging" from the point of view of agglomeration economics, please refer to Brezis·Krugman·Tsidden[1993].
- ¹² Refer to end-note 2-10, or Fujita·Krugman·Mori[1998] for more details.
- ¹³ Fore more detailed analysis using labor productivity (not only limited to industrial structure), refer to Fujita, Hisatake (1998).
- ¹⁴ This sub-section is a further development of Hisatake, Haratoh (2002)'s section 2 (3), and its update.
- ¹⁵ The metropolis settings formulated in Kanemoto and Tokuoka (2001) was referred to. In Mori and Nishikimi (2001) the usage of this metropolis setting using commuting zones allowed for a more clear demonstration of layered structure among metropolis, than when using all other administration classifications.
- ¹⁶ In the research concerning business cycles in the U.S., it is pointed out that not every city goes through a similar business cycle, a clear contrast from the case of Japan. A comparative study between the U.S. and Japan on the distribution of economic growth, shows that data for Japan is less scattered than the U.S. (see figure below). The two countries naturally use a single currency within their own domestic market, it can be seen that even in the case of developed countries like the U.S. or Japan, the level of similarity to shock is quite different from one region to another.

Figure: Trend in Economic Growth Rate and its Dispersion in the US and Japan



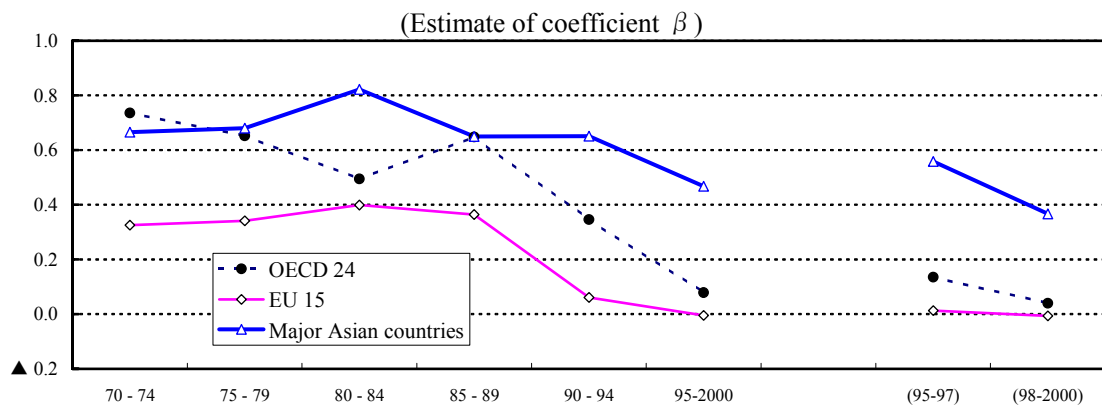
Note: For the Japan, the graph demonstrates the dispersion of per capita GDP growth by prefectures. For the US, the graph corresponds to the dispersion of the per capita growth rate of Gross State Product by state. The Japanese data for 1980-1984 excludes the Okayama prefecture.

Source: Hisatake, Haratoh (2002) table 2-14

¹⁷ Following the model of Feldstein and Horioka, a recurrent expression that explains the ration of investment on GDP (I/Y) using the ration of savings (S/Y) was estimated to measure to what degree investment is away from the restriction of domestic savings. The following is the result.

It is plausible that the cross-border capital movement had greatly improved after 1990 for EU-15, and after 1995 for OECD-24.

In contrast, there was not much different in the β coefficient between major Asian countries and OECD-24 in the 1970's, but whereas the β coefficient remained more or less unchanged for Asia during the early half of the 1990's, that for OECD-24 decreased considerable, widening the gap. Recently, when looking at 98-2000, the β coefficient is decreasing for Asia as well, narrowing the gap with OECD-24. It can be observed that international flow of capital is liberalized in Asia as well, and that domestic investment is less restricted by domestic savings, and a global integration of the financial market is progressing, even though the level is still low compared to OECD countries.



- Notes: 1. A regression equation was estimated for the EU, OECD and major countries and regions of Asia to explain the proportion of investment to GDP (I/Y) by the proportion of savings (S/Y).

$$(I/Y) = \alpha + \beta * (S/Y)$$
2. Figures for the OECD focus on 24 countries that joined the OECD up till the 1970s, and members joining in the 1990s - Czech Republic, Hungary, Republic of Korea, Mexico, Romania, Poland and Slovakia - are excluded.
3. Major countries and regions of Asia are: Japan, Republic of Korea, Singapore, Hong Kong, Taiwan, Malaysia, Thailand, Indonesia, Philippines, China and India.
4. Data used was solely that from the CD-ROM of the WDI 2002 edition. However, for some countries and regions data is not available for some years and in such cases calculations were made on the basis of the data that was available.

Source: Hisatake and Ozeki (2003)