

**Is Cost Competitiveness a Prerequisite for Growth?
- Application of the Theory of Comparative Advantage
in Understanding Developing Countries' Export Growth in Asia**

by

MINAMI TSUBOUCHI

B.A. Policy Management
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Submitted to the Department of Urban Studies and Planning
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MASTER IN CITY PLANNING

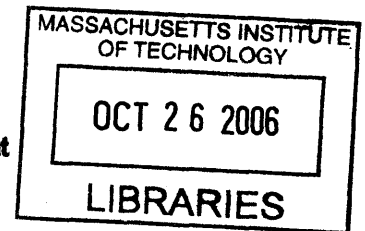
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Author _____

Department of Urban Studies and Planning
May 24, 2006

Certified by _____

Alice H. Amsden
Department of Urban Studies and Planning
Thesis Supervisor

ROTC

Accepted by _____

Professor Langley Keyes
Chair, MCP Committee
Department of Urban Studies and Planning

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Abstract

The theory of comparative advantage argues that countries benefit from trade even without cost competitiveness and that what matters is the difference between efficiencies at which a country can produce different goods and services within its economy. In reality, however, a significant proportion of trade seems to occur based on cost competitiveness. China's exports to Japan have skyrocketed in the last decade, but the growth is mainly in labor-intensive industries because of the competitive prices that China can offer in global markets. This study intends to review the limitations of applying the theory of comparative advantage to interpreting the recent economic growth in Asia through theoretical reviews and a case study on Japan and China.

The analysis reveals that comparative advantage can drive a developing country without cost competitiveness to growth of exports on the condition that a hierarchical mechanism exists in which an advanced country creates demand for further specialization through industrial upgrading and hands over its declining industries to the developing country. When the advanced country's need for further specialization is not sufficient, the developing country would be compelled into cost competition with the advanced country. In other words, cost competitiveness is a prerequisite for a developing country to grow in bilateral trade when the advanced country's industrial upgrading decelerates.

Developing countries' only source of cost competitiveness is their abundant labor, and labor can only help the country flourish in the labor-intensive, low-value-added industries. Hence, in pursuit of developing countries' further growth in higher-value-added industries, it is crucial to formulate policies to create a hierarchical mechanism in which a developing country takes over industries from an advanced country in such a way that the two countries' comparative advantages would be most effectively leveraged.

Thesis Supervisor: Alice H. Amsden

Title: Barton L. Weller Professor of Political Economy, Department of Urban Studies and Planning

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List of Abbreviations

ASEAN	Association of Southeast Asian Nations
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
JPY	Japanese Yen
NIE	Newly Industrialized Economy
ODA	Official Development Aid
OECD	Organisation for Economic Co-operation and Development
USD	United States Dollars

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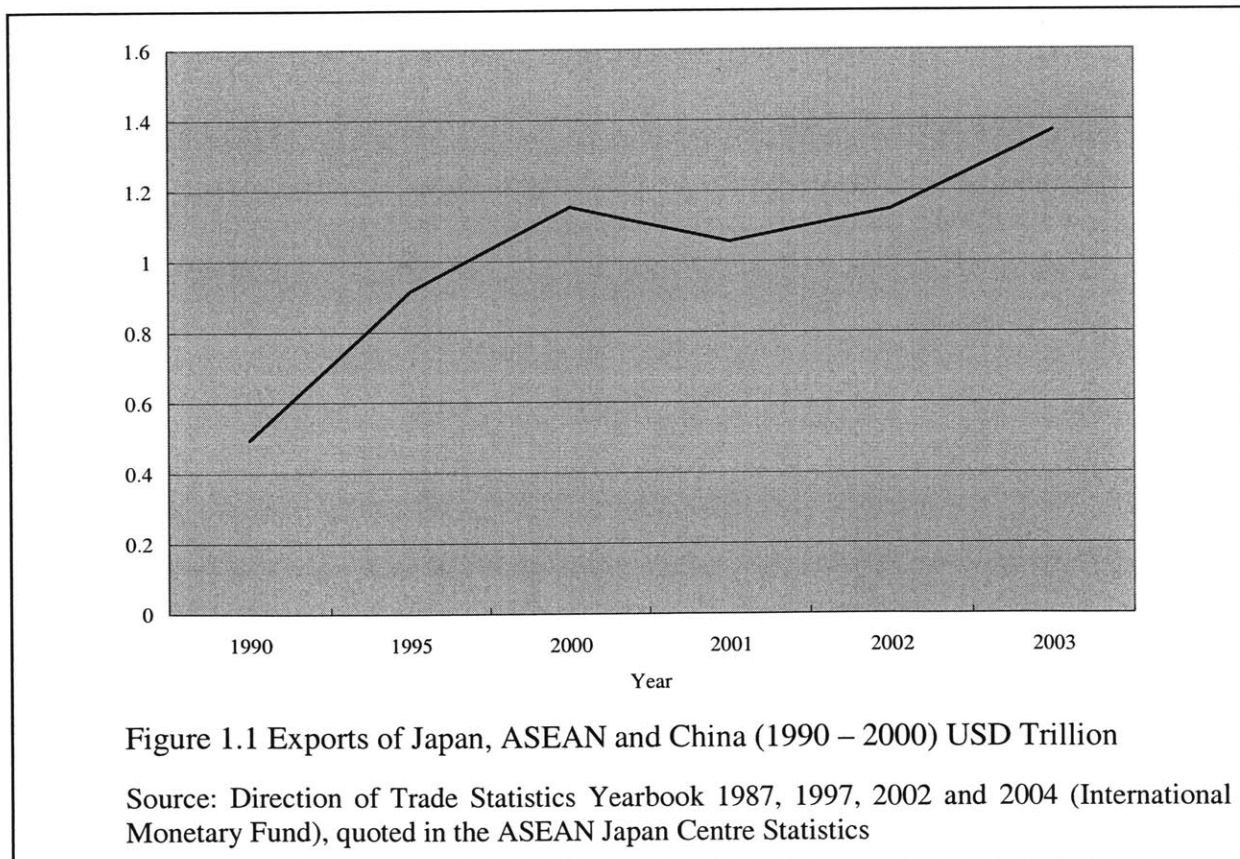
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Chapter 1

Introduction

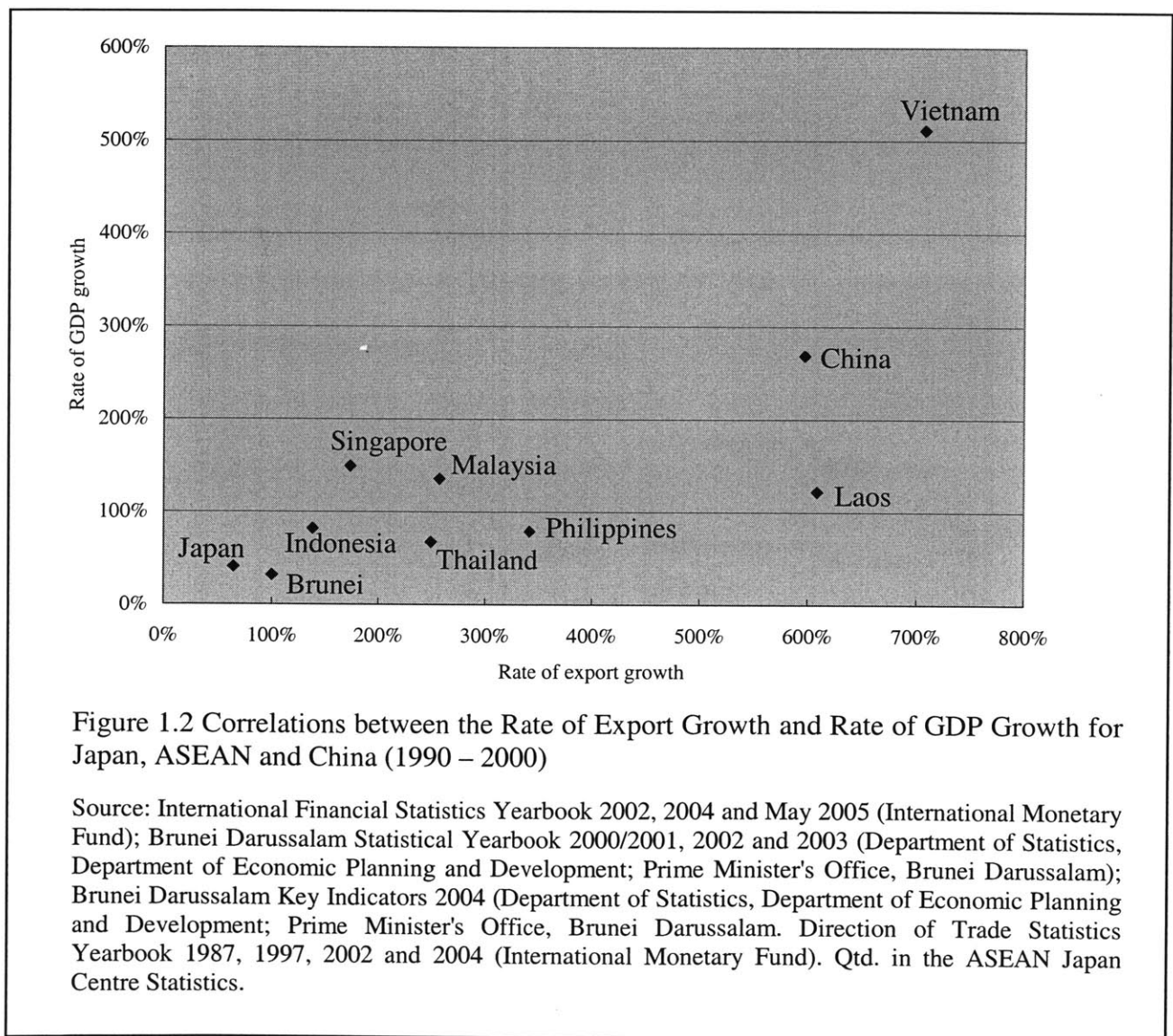
1.1 Background

The rapid and dynamic economic growth achieved in East and Southeast Asia after WWII is truly a remarkable phenomenon in the world's economic history. Although the growth temporarily decelerated and halted during and after the Asian currency crisis, the region, notably Japan, China and ASEAN¹ countries, continued steady growth by expanding its exports (Figure 1.1).



¹ Association of Southeast Asian Nations. Member countries are Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam.

Although numerous factors underlie the countries' economic growth and clearly export expansion is not the only key factor, a considerable level of correlation seems to exist between the countries' export growth and GDP growth in Asia² (Figure 1.2). Higher growth in export coincides with GDP growth, and it is highly likely that having an effective export expansion strategy is crucial in promoting developing countries' economic growth.



² Cambodia and Myanmar are excluded from the analysis because of the insufficient data.

Yet the debates on factors driving Asia's export expansion are contentious. According to the theory of comparative advantage, one of the most prevalent theories for understanding international trade, in order for countries to benefit from trade, exporting countries would not need to have higher cost competitiveness than importing countries. Rather, the difference between efficiencies at which countries can produce different goods and services determines the volume of international trade. In reality, however, a significant proportion of trades seem to occur based on cost competitiveness. China's exports into Japan have skyrocketed in the last decade, but the expansion is mainly in labor-intensive industries because of the competitive prices China can offer in global markets³.

The flying-geese model, developed by a Japanese economist, Kaname Akamatsu, in the 1930s, complements the theory of comparative advantage by taking demand linkages into consideration. It argues that growth in advanced countries' economies would drive developing countries' exports and that stagnation in advanced countries would hold back developing countries' growth.

1.2 Research Question

The central question that this paper aims to answer is whether a developing country needs to be able to produce goods and services more cheaply than an advanced country in order to grow in export to the advanced country. Were the theory of comparative advantage to be valid, the answer to this question would be that a developing country could expand its export without

³ C.H. Kwan. *The Rise of China and Asia's Flying-Geese Pattern of Economic Development: An Empirical Analysis Based on US Import Statistics*. 2002.

cost competitiveness, but the contradictory reality suggests that the theory is not valid in explaining the developing countries' export expansion in Asia.

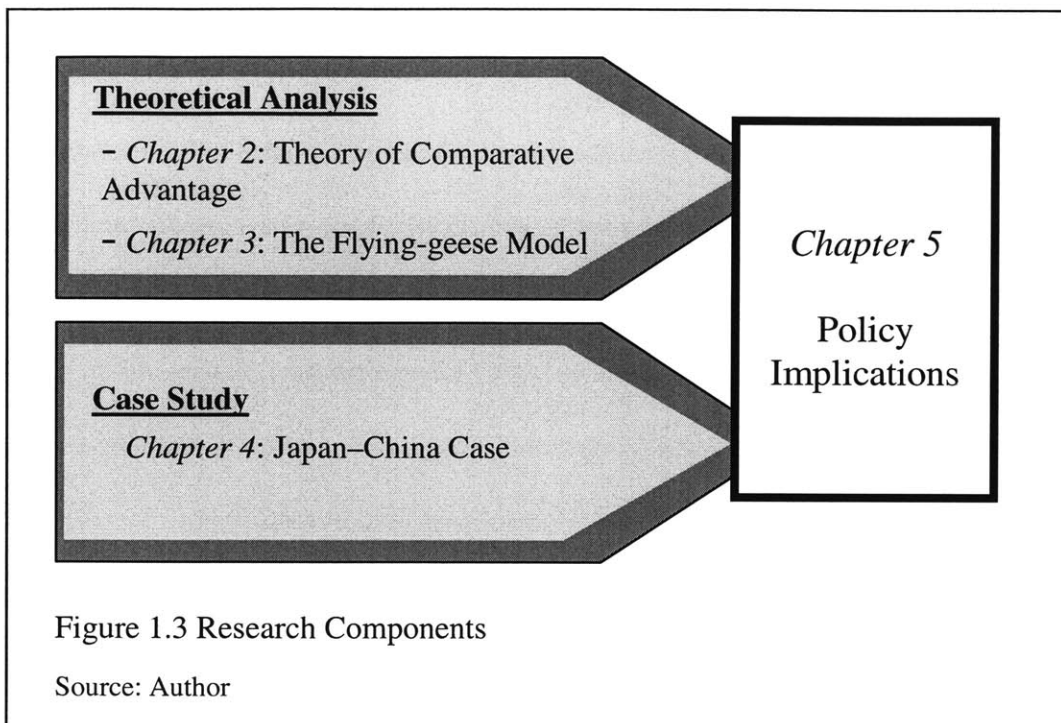
Hence, an attempt to find an answer to the central question would entail asking why the theory of comparative advantage is insufficient to explain the expansion of exports of Asia's developing countries and to show how the expansion could be better understood. The specific questions to be answered in this research are as follows:

- What are the limitations of applying the theory of comparative advantage to interpreting the growth of regional exports?
- How does the "flying-geese model" complement the theory of comparative advantage in the attempt to consider the role of advanced countries in fostering the growth of exports in developing countries?
- Under what circumstance are developing countries required to have cost competitiveness?
- What policies are required for developing countries' export growth?

Answering these questions should help explain the role that cost competitiveness, or productivity, plays in facilitating the growth of exports in developing countries and also suggest policies that would be essential in promoting the growth of exports in developing countries in Asia.

1.3 Research Methodology

The study is composed of two components: theoretical analysis and the case study.



Theoretical analysis reviews the principal theory of comparative advantage and its limitations. Because the theory of comparative advantage makes several crucial assumptions, the analysis will examine the conditions that make those assumptions valid. Then, the flying-geese model is introduced to complement the theory of comparative advantage in understanding growth in exports in the region.

The case study on Japan and China, in which China's exports to Japan have been going through remarkable expansion, complements the theoretical analysis by presenting a specific example in which the theory of comparative advantage and the flying-geese model are not valid. It examines why China's export growth has been based on China's cost competitiveness instead of the two countries' comparative advantages by quantifying the shifts of the two countries' comparative advantages.

1.4 Research Structure

Chapter 2 examines the principal theory of comparative advantages and its limitations in analyzing China's growth in exports. Chapter 3 introduces the theory of the "flying-geese model" to complement the theory of comparative advantage for understanding China's rapid growth in exports. The case study is presented in Chapter 4, with details of Japan's comparative advantage shift and its impact on imports from China. The chapter also examines how the two theories could help understand the remarkable growth in Asia. Chapter 5 addresses policy implications, using the results of the theoretical analysis and the case study.

The study aims to foster the understanding of the trade mechanism between a developing country and an advanced country, in a broader framework, where discussions are not limited to either country's perspective alone. This research is also intended to help draw growth scenarios for other developing countries that envision growth through exporting to advanced countries.

Chapter 2

Comparative Advantage

2.1 Principal Theory

Robert Torrens first developed the theory of comparative advantage in an essay on corn trade in 1815, but the idea was formalized by David Ricardo in his book *The Principles of Political Economy and Taxation* in 1817⁴. Since then, it has been one of the most important theories in understanding international trade. When Paul Samuelson, a Nobel Laureate in economics, was challenged to provide “a law of economics that is both true and non-trivial” (Ruffin, p. 727), he mentioned the comparative advantage. Yet the theory is so counter-intuitive that it has caused a great deal of confusion and misunderstanding in debates on international trade.

In his work, Ricardo explained the theory by using a numerical example⁵. England can produce one unit of cloth using 100 men in one year and one unit of wine using 120 men for the same time. On the other hand, to produce one unit of cloth in Portugal requires only 90 men and to produce one unit of wine in Portugal requires 80 men, both in one year (Table 2.1). Overall, Portugal can produce both cloth and wine at a lower cost than England.

Adam Smith argues: If a foreign country can supply us with a commodity cheaper than we ourselves can make it, better buy it of them with some part of the produce of our own industry, employed in a way in which we have some advantage (Smith, p. 573), and it seems intuitively correct for England to purchase two products from Portugal but not for Portugal to

⁴ Ruffin, Roy. *David Ricardo's Discovery of Comparative Advantage*. 2002. p. 727.

⁵ Ricardo, David. *The Principles of Political Economy and Taxation*, Chapter VII.

purchase from England. However, Ricardo’s counter-intuitive argument is that it makes sense for both countries to trade even in such a situation.

Table 2.1 Number of Workers Required for Producing One Unit of Goods

	Cloth	Wine
England	100 men	120 men
Portugal	90 men	80 men

Source: Ricardo, David. *The Principles of Political Economy and Taxation*, Chapter VII

Table 2.2 Volume of Outputs before Specialization

	Cloth	Wine
England	1 unit	1 unit
Portugal	1 unit	1 unit

Source: Ricardo, David. *The Principles of Political Economy and Taxation*, Chapter VII

If England decides to specialize exclusively in production of cloth using 220 men, it would have 2.2 units of cloth and no wine. If Portugal devotes 170 men in production of wine, it would have 2.125 unit of wine and no cloth (Table 2.3).

Because it used to cost England 120 men to produce 1 unit of wine, England would be willing to purchase wine from Portugal at a cost of 120 men at most. From the other perspective, Portugal would be willing to sell its wine at a cost of at least 80 men. Hence, the price of wine should be set in the range of 80 to 120 units of men. Assuming that the negotiation reached an agreement at the cost of 100 men, England pays 100 men in the form of cloth, which is equivalent to 1 unit of cloth. Similarly, Portugal would purchase cloth from England, at the minimum price of 100 men, England’s production cost. Although it costs Portugal more than it

would when they produce it themselves, Portugal is able to bear this cost because they have an increased income from selling wine to England.

Table 2.3 Volume of Outputs after Specialization

	Cloth	Wine
England	2.2 units	0
Portugal	0	2.125 units

Source: Ricardo, David. *The Principles of Political Economy and Taxation*, Chapter VII

Table 2.4 Volume of Consumption after Trade

	Cloth	Wine	Total Consumption
England	1.2 units	1 unit	2.2 units
Portugal	1 unit	1.125 units	2.125 units

Source: Ricardo, David. *The Principles of Political Economy and Taxation*, Chapter VII

As Table 2.4 shows, both countries benefit from engaging in trade, having larger total consumption than before trade. Although Portugal can produce both goods at a lower cost, trade still benefits both countries.

This theory completely disproves Adam Smith's claim yet is an encouraging statement for developing countries that are not as skilled in production as advanced countries. The gap between industrialized countries and unindustrialized/late-industrializing countries in Asia has been wide, even considering the economic and social damage Japan received during/after WWII. The theory of comparative advantage suggests that having production capability comparable to that of advanced countries is not a requirement, although it is advantageous, for fostering export activities as a means for economic growth.

2.2 Assumptions

The theory of comparative advantage is valid only under several critical assumptions. The assumptions can be examined from two standpoints: the perspectives of developing countries (exporters) and of advanced countries (importers).

Developing countries' perspectives

a) Sufficient resources

The theory assumes that a country always has sufficient, if not abundant, resources to specialize in goods in which it has a comparative advantage. Resources include labor, capital, and land, and possibly more; however, these resources are often scarce or limited in reality.

b) Perfect inter-industry mobility of factors of production

Being able to move factors of production freely is another critical assumption underlying this theory. In the case of England and Portugal, the two countries smoothly moved labor from production of one type of goods to another without significant transaction costs. In many industries, however, significant transaction costs incur in the course of specialization. A wine producer cannot turn into a cloth producer overnight; it requires technical and psychological adaptation to change one's profession, and necessary efforts and subsequent costs could be too large to neglect.

c) Constant opportunity cost

The theory assumes that the opportunity cost remains constant, which is hardly the case in reality. Countries' comparative advantages change both in the short-term and long-term for numerous reasons such as weather, wages, population changes, and more.

d) Full employment

Full employment is another critical assumption of the theory. Although both England and Portugal allocated all their labor to the industries of their comparative advantages in the example, in reality, it is extremely difficult to achieve full-employment due to difficulties in adjusting macro-economic conditions as such.

Perspectives of advanced countries

a) Constant labor costs

The theory does not take into consideration changes in wage levels. In the example, the opportunity costs were calculated based on the assumption that one unit of labor in England was equal in value to that in Portugal. In reality, however, this is almost always incorrect; wage levels often differ significantly even within countries, and one would not find two countries where wage levels are exactly the same.

b) Demand that exceeds production capacity

The theory of comparative advantage concludes that countries benefit from trade because trade allows the world to consume more with the same level of inputs. However, it is a debatable question whether countries actually wish to consume more. Using the example of Portugal and England, one could question whether the two countries wish to consume more of the goods than

they did before trade. If the two countries were satisfied with the initial level of consumption, there should be no trade. Trade would occur only when a country's demand exceeds its production capacity; in other words, a country would import only when it could not produce outputs enough to fulfill domestic demand on its own.

2.3 Advanced Countries' Creation of Demand

When a developing country aims to foster its economic activities by harnessing exports, external constraints could be perceived as more problematic than internal constraints. Internal constraints could be addressed by adopting sound policies within a domestic sphere, while external constraints that are rooted outside the country would be highly dependent on other nations' economic conditions and their governments' policies, which are beyond the control of the developing country.

This section examines in more detail the assumptions that have been discussed from the perspectives of importing countries (advanced countries) to better understand how the exporting strategy of a given country could be constrained by economic conditions in another country that imports from the first one.

Changes in wage levels

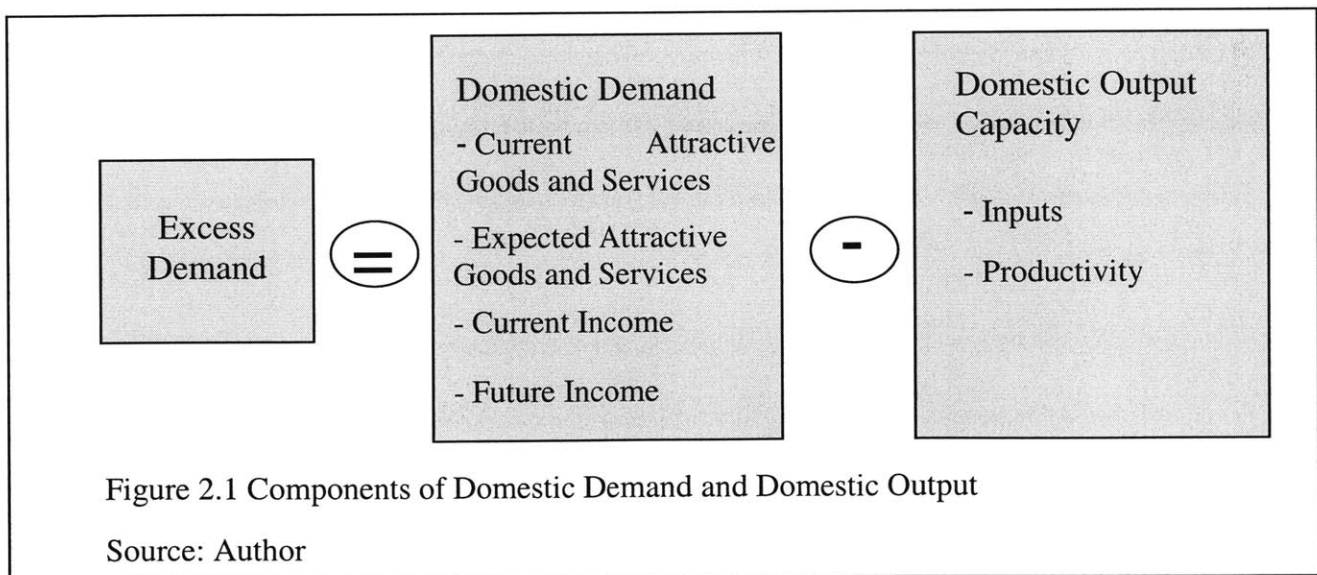
Because wage levels differ across industries, countries, and regions, countries' opportunity costs and trade decisions are assessed with far more accuracy when labor inputs are calculated based on the costs incurred in deploying the labor force rather than the number of workers employed in the course of production. In the quantitative assessment undertaken later in this study, countries' comparative advantages are evaluated based on labor costs instead of worker headcounts.

Concept of Excess Demand

Excess demand can be described in a simple equation:

$$\text{Excess demand} = (\text{Domestic demand} - \text{Domestic output capacity})$$

Gregory Mankiw claims: If output falls short of domestic spending, we import the difference. (Mankiw, 2003) In other words, when a country wishes to consume more than it produces, there is naturally excess demand, which should be filled with imports from other countries. Domestic demand and domestic output are determined by numerous macro-economic factors and, in the short run, fluctuate with significant variances. In the long run, however, they can be attributed to several major factors, as shown in Figure 2.1:



a) Factors affecting domestic demand

Domestic demand depends on three major factors, using a model that can be represented as the following:

$$DD = f(Q, Q^*, Y, Y^*),$$

where DD is the current level of domestic demand, Q is the availability of attractive goods and services, Q* is the expected availability of attractive goods and services, Y is the income, and Y* is the expected income. The model states that demand is determined by supplies of consumable goods and services and affordability, using both current figures and expected figures.

- i. Current attractive goods and services (Q): Attractive goods and services are an essential prerequisite for growth in consumption. The existence of attractive goods and services stimulates consumers' willingness to consume more. On the other hand, in an economy where people have excess cash but there are not attractive goods and services, most of the cash would simply go into savings or investment. Thus, a rise in Q is expected to cause a rise in DD.
- ii. Expected attractive goods and services (Q*): When one expects to observe more attractive goods and services in the future than today, one may decide to postpone the consumption to a future date when there are better choices, and therefore a rise in Q* is likely to affect the level of DD inversely.
- iii. Current income (Y): Except for some inferior goods, more goods and services are consumed when income rises, although the marginal rise in consumption diminishes as the income continues to rise. Higher Y results in higher DD.
- iv. Future income (Y*): Current demand is also influenced by future income. When a higher income is expected in the future, more could be consumed today with the thought that there is less need to save. A higher Y* positively correlates with DD.

b) Factors affecting domestic output capacity

The Cobb-Douglas production function explains the national income structure by using the following function:

$$Y = f(K, L) = AK^\alpha L^{1-\alpha},$$

where Y is total output, A is a parameter greater than zero that measures the productivity of the available technology, K represents capital, L represents labor, and α is a constant between zero and one.⁶ The model implies that total output is a function of inputs (resources), most of which are described as labor (L) and capital (K), and that the function represents the technological productivity at which resources are used to produce outputs.

i. Inputs (Resources)

Labor: Over a long run, labor input should be assumed to be constant because most advanced countries have not observed a significant growth in their populations, although some exceptions to this statement exist; in some countries, mainly in the developing part of the world, population has risen to a noticeable extent. However, from the perspective of advanced countries, labor inputs are assumed constant in this section.

Capital: Capital can change over time. As capital naturally flows into opportunities where high returns are expected, capital tends to concentrate where attractive investment opportunities arise. Many economic and social factors such as interest

⁶ Mankiw. p. 71.

rates, exchange rates, business dynamics, political stability, public corruption, etc. can influence investment climates.

ii. Productivity

Productivity reflects the efficiency at which inputs are used to produce outputs. Hence, productivity greatly depends on where economic activities stand in the economies of scale. An increasing return to scale leads economic activities to improve the productivity of economic activities, and a decreasing return to scale has an inverse effect on the productivity⁷. Yet government policies could play a vital role in the overall improvement of the country's productivity. Actions that foster business dynamics and their competitiveness such as sound deregulations, promotion of accountability, elimination of corruption, and vocational/professional training, could drive the productivity growth of the country.

2.4 Conclusion

The theory of comparative advantage explains the export activities of developing countries to advanced countries well, and its statement that an absolute productivity advantage is not a prerequisite for a country to succeed in exports would be a valuable foundation for discussing the strategies of developing countries for export activities and economic growth.

However, further analysis has shown that the existence of excess demand in advanced countries (importers) is required for developing countries to grow in export activities. The implication of this finding is that fostering economic growth through export promotion could not be achieved by domestic efforts only. The successful strategy for export growth would need to

⁷ Yeo, Lionel. *Growth Strategies of Small Nations*. 2004. p. 14

address a larger picture that captures the economic conditions of the advanced countries (importers).

The next chapter introduces the “flying-geese model” to examine the interrelations between the changes in demand in advanced countries and their effects developing countries’ export growth.

Chapter 3

The Flying-geese Model

3.1 Principal Theory

The flying-geese model was first introduced to describe the life cycles of industries in the course of economic development by Kaname Akamatsu in 1962, with the focus on specific industries in specific countries. Subsequently, Kiyoshi Kojima's new theory⁸ extended the model to study the dynamic changes in the industrial structure in specific countries and further to examine the shift of industries from one country to another.⁹

When the model is applied to interpreting the domestic specialization of a country, changes in a comparative advantage of the country usually lead to an upgrading of its industrial structure; this upgrading can be represented by a series of V-shaped curves moving towards more technology-intensive industries¹⁰ (Figure 3.1).

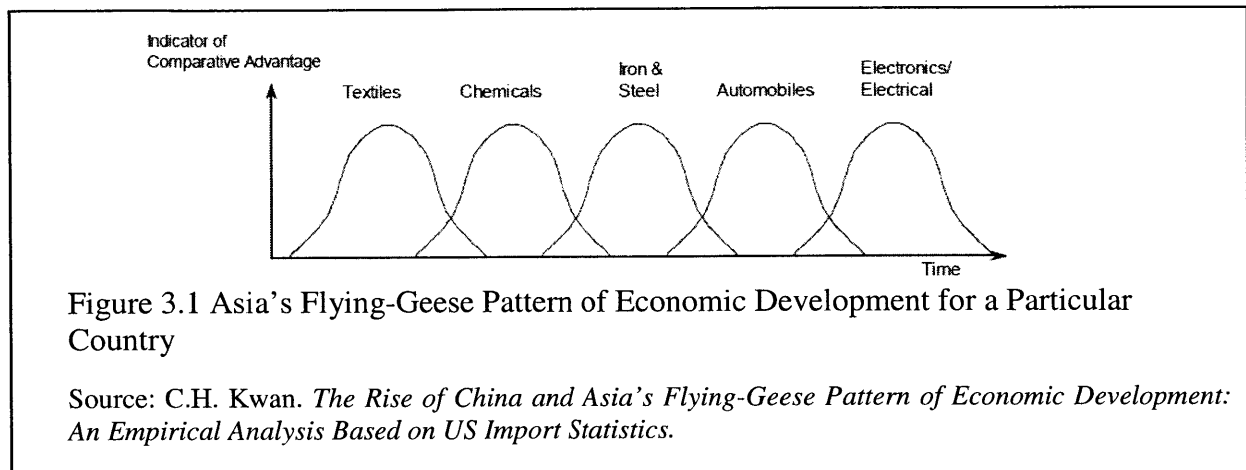
A country that specializes in less technology-intensive production such as textiles acquires technological capability over time, gaining a greater comparative advantage in more technology-intensive industries such as chemicals. An upgrading of the industrial structure occurs through a repetition of this process, from textiles to chemicals, from chemicals to iron and steel, and so on, and the country achieves growth by exporting items in which they have the greatest comparative advantage at different developmental stages. This phenomenon can be explained well by adding the concept of technology/knowledge acquisition over time to the

⁸ Kojima, Kiyoshi. *The "Flying geese" model of Asian economic development: origin, theoretical extensions, and regional policy implications*. (2000)

⁹ Kwan. p. 2.

¹⁰ Kwan. p. 4

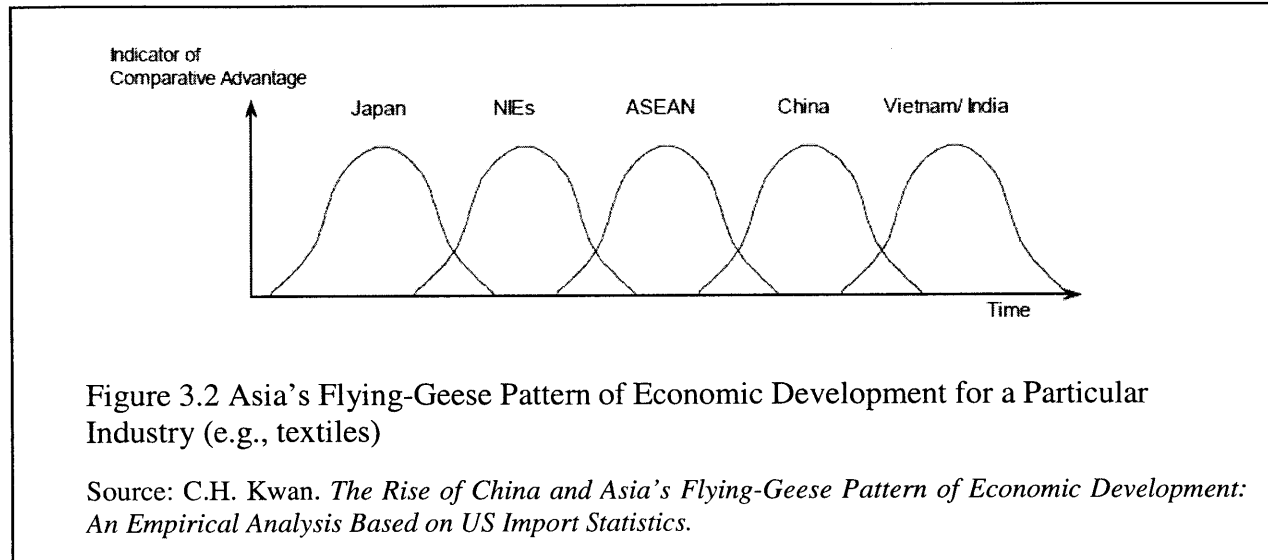
theory of comparative advantage. Countries change their specialization patterns as they gain technological capabilities and their comparative advantages change over time.



Developed from the theory of comparative advantage, the flying-geese model faces the same major limitation as the theory of comparative advantage; an importing country must have an excess demand for goods and services. A country cannot shift its area of specialization from textiles to chemicals simply because it is relatively better at producing the latter. It would benefit from specializing in production of chemicals provided that sufficient demand exists to absorb the increased production. Otherwise, the market would have oversupply of chemicals, lowering the price to an extent where production would no longer make economic sense.

The flying-geese model explains the linkage between demand expansion and specialization development by expanding the discussion into a cross-border context. It describes how an industry can be taken over by developing countries from advanced countries by showing

the positions of different countries for a particular industry with the inverted V-shaped curves¹¹ as Figure 3.2 shows.



The model supplements the theory of comparative advantage by addressing international or interregional economic dependence. Ozawa argues that the flying-geese model explains that individual countries' efforts alone cannot explain the economic growth of developing countries' and that it is essential to address underlying region-wide mechanisms that simultaneously promote regionalized growth.¹² As Figure 3.2 shows, an upgrading in a country's industrial structure occurs when a preceding country acquires a greater comparative advantage in a new industry and hands over the industry of their former comparative advantage to the succeeding country. The handover includes the demand that had existed for the industry. This handover process enables a developing country to shift into a new pattern of specialization by assuring sufficient demand to absorb its production.

¹¹ Kwan, p. 2.

¹² Ozawa, Terutomo. *Asia's Labor-Driven Economic Development, Flying-Geese Style: An Unprecedented Opportunity for the Poor to Rise?* 2005.

3.2 Assumptions

In claiming that the acquisition by advanced countries of new, greater comparative advantages drives the export growth of developing countries, the model makes two major premises: the regional industrial transformation must be in progress constantly and the hierarchy among the regions must be maintained.

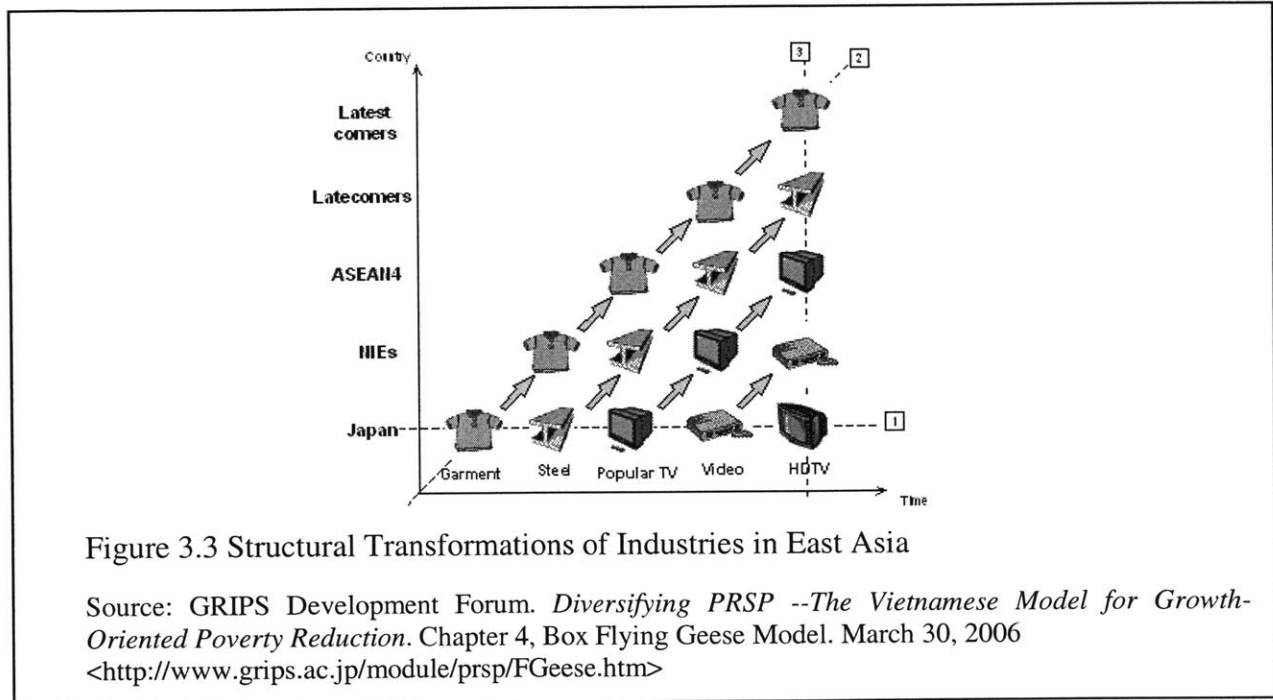
Seamless Industrial Upgrading and Handover in the Region

The flying-geese model states that preceding countries' continuous acquisition of new comparative advantages is a prerequisite for industrial handovers with succeeding countries. Kwan explains Asia's rapid economic growth in the twentieth century with the model and concludes, "Those Asian countries that have actively participated in the flying-geese formation of labor-driven tandem growth are the ones that experienced significant poverty reductions." (Kwan, p. 3). Figure 3.3 presents the way in which successive shifts into more technology-intensive industries enable handovers to succeeding countries.

As Japan acquires a greater comparative advantage in the production of steel, the production of garments becomes comparatively disadvantaged within Japan although it still might be competitive in the global market. As concluded in the discussion of comparative advantages, Japan would benefit from specializing in the production of steel and handing over the production of garment to the Newly Industrialized Economies (NIEs),¹³ and the repetition of this process from more advanced countries to less advanced ones should help spur the economic growth of the entire region. Hence, advanced countries' seamless acquisition of greater

¹³ Newly Industrialized Economies. Most notably, South Korea, Hong Kong, Singapore and Taiwan.

comparative advantages and subsequent handovers of the comparatively disadvantaged industries to less advanced countries is a prerequisite for the flying-geese model growth to occur.



Maintenance of the Hierarchical Model

As concluded in the previous section, the seamless acquisitions of new comparative advantages by the preceding countries is the fundamental premise for comparative-advantage-driven regional growth, and the United States and Japan, the two countries with the largest economies in the world, lead the flying-geese formation on a global scale and in Asia, respectively.¹⁴ The two countries fly ahead of other “geese” and drive the growth of the regional

¹⁴ Schroppel, Christian, and Mariko Nakajima. *The Changing Interpretation of the Flying Geese Model of Economic Development*. p. 204.

economies and also the world economy. Furuoka uses the concept of “lead geese” to explain Asia’s hierarchical economic growth:

In the ‘flying geese’ model of regional integration, Japan as the leading goose leads the second-tier geese (less-developed countries) which, in their turn, are followed by the third-tier geese (least developed countries) Parties involved in this type of arrangement are not equal partners as there always is a dominant country – the ‘leading goose’ – that pilots the rest of the gaggle; the patron-client relationship is typical for this kind of organization.(Furuoka, par. 12-13)

As previously presented in Figure 3.3, the maintenance of a hierarchical structure among countries in a region is a key factor for successful tandem growth in the region, and therefore it is in the interest of lead geese to support other geese in fostering their production capability, yet without encouraging possible catch-up of the following geese in the gaggle.

3.3 The Role of the Lead Geese

In order for countries to continue to acquire greater comparative advantages while maintaining the hierarchical growth of the region, growth and decline must take place in tandem. On the one hand, a lead goose must nurture its innovative economic activities so that it can grow into new productions. On the other hand, the lead goose must withdraw from its comparatively disadvantaged industries.

Lead geese could play an active role in assisting in the sequential progression of the industrial transformation within the region. In fact, regardless of the tier in the gaggle it belongs

to—whether it is Japan in the top-tier or a country like South Korea or Taiwan in the second-tier—countries are strongly motivated to assist the following countries because the theory of comparative advantage has revealed that growth in trade and the following regional economic growth should benefit all countries participating in trade.

Dynamic Growth

A country's industrial upgrading occurs as it learns to utilize its resources to produce new outputs of higher value-added, and therefore, technological growth that promotes innovations and enhances the country's productivity is an essential factor for the flying-geese model of growth. Technological growth that would generate higher value-added requires attracting talented human capital as well as ample financial capital. Yeo argues:

“Developed and developing countries operate on different parts of the production function. Developing economies have higher production elasticities of capital compared with developed economies.... Capital accumulation is most important for countries at an initial phase of development. As diminishing marginal productivity of capital sets in, technical progress will take on greater significance.”¹⁵

For countries that have achieved a certain level of capital accumulation, attracting human capital with talent and creativity is the single most important item on the agenda, as the country's industrial structure shifts from one that would benefit from abundant labor and heavy equipment to one that would require knowledge inputs to generate greater outputs. For example, Singapore, one of the wealthiest countries in Asia today, started the technological catch-up in 1970s after

¹⁵ Yeo. p. 14

achieving full employment by attracting foreign direct investment in manufacturing in 1960s.¹⁶ In the attempt to catch up with the advanced countries' technological progress, the Singaporean government introduced active measures to upgrade the country's workforce profile. Today, the government spends about 4% of its GDP on education, a higher percentage than many other countries, and the skill profile of the workforce has advanced drastically—the proportion of managerial professions increased from 22% to 42% between 1985 and 2001¹⁷. The well-trained workforce has played a central role in upgrading Singapore's industrial structure from a labor-intensive one to a knowledge-based one in the past decades.

On the other hand, countries without significant resources need to specialize in production with their labor resources. As they attempt to make headway from handcrafts into steel production, they would need to introduce machinery and heavy equipment to improve the efficiency of their production, and financial capital that enables the upgrading of the physical infrastructure would facilitate great advancement.

Smooth Decline

A lead goose's growth into new, comparatively advantaged industries entails a decline in another sector. Because comparative advantage is a relative concept within the country, the acquisition of a new comparative advantage automatically renders another industry comparatively disadvantaged, and the country would generate a greater volume of economic outputs by allocating its resources from a comparatively disadvantaged industry to a comparatively advantaged one.

¹⁶ Yeo. p. 75

¹⁷ Yeo. p. 84.

To ensure smooth and continuous transfers of industries in a hierarchical structure, however, the following geese must be equipped with sufficient knowledge and technologies to produce goods that had been produced by the lead geese. Without these capabilities of the following geese, the lead goose would be unable to hand over the comparatively disadvantaged industry and to import goods and services from the following geese. In continuing to hand over industries from preceding countries to following countries, lower-tier geese must continue to develop their production capabilities.

These activities that seamlessly enhance capabilities are often supported by preceding countries in the form of foreign direct investment (FDI). By providing appropriate capital goods and technology, FDI helps developing countries achieve a stronger comparative advantage in producing goods of an investing country's comparatively disadvantaged industry.¹⁸ Sugawara explains FDI's benefits for both advanced and developing countries:

.... Industries that lost comparative advantages in advanced countries could be revitalized with new comparative advantages in developing countries. This is also called "Comparative advantage recycling: CAR" process. A labor-intensive textile industry that has lost its comparative advantage in country A starts local production in country B with direct investment, acquiring a new comparative advantage in country B. Textile products produced by country B are sold within the country and also overseas; some of them are also sold in country A. In country A, capital and resources (physical and human) move from the textile industry in which the comparative advantages to a more capital-intensive industry, generating a new comparatively advantaged industry. Through this

¹⁸ Kojima, p. 383.

process, upgrading of industrial structures continues in both countries A and B.

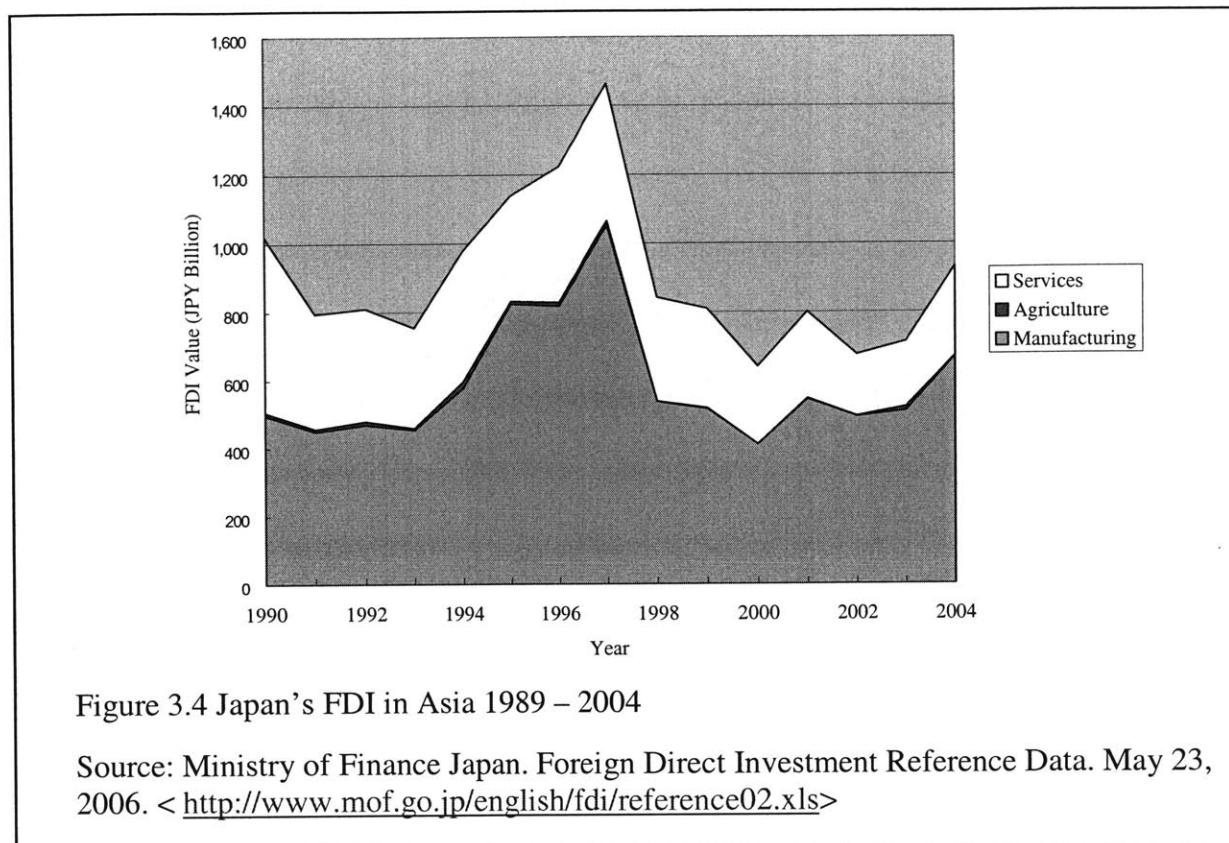
(Sugawara, p. 4)

Kojima calls FDI that facilitates succeeding countries' export activities "Pro-trade oriented FDI (PROT-FDI)" and argues that PROT-FDI and the following industrial handovers benefit not only developing countries who receive investments but also advanced countries because, as a result of the handover, resources would be released from the advanced country's comparatively disadvantaged industry and those resources could be reallocated to an industry of their greater comparative advantage, leading to an expansion of the country's total output and productivity.¹⁹

All these arguments make it clear that, in addition to the lead geese's continuous growth into more sophisticated production, efforts to provide adequate capital goods and technology in the form of PROT-FDI and to support the following geese to augment their production capabilities play a major role in nurturing the flying-geese model in the region.

FDI, therefore, is often concentrated in industries that have lost comparative advantages in advanced countries and are expected to acquire ones in developing countries. Figure 3.4 provides an example shows that Japan's FDI has been rising in manufacturing and decreasing in services despite a drastic fall in both industries in the late 90's during the Asian Currency Crisis; the Figure implies that Japan's own comparative advantage is fading in manufacturing but growing in services.

¹⁹ Kojima, p. 383.



3.4 Conclusion

How far away the predecessor could fly is the most fundamental question in analyzing regional economic growth with the flying-geese model. When the predecessor fails to grow into new industries and to augment its level of economic development, successive industrial handovers would not occur, resulting in no expansion of excess demand. As discussed in Chapter 2 on the theory of comparative advantage, excess demand is a critical factor in fostering export-oriented economic growth based on countries' comparative advantages.

When countries are unable to export based on comparative advantages, developing countries are forced to enter direct competition with advanced countries. Therefore, most of them would remain in low-tech production for which their low-cost and abundant labor has an

absolute advantage. Moving further into higher value-added production would be an immensely difficult task because competing in more sophisticated production on the global or regional level would require technological progress to surpass preceding countries' production capabilities.

The next chapter examines China's export growth to Japan and analyze whether the rapid increase in China's export to Japan has been based on comparative advantages or absolute advantages.

Chapter 4

Case Study

Japan's Industrial Upgrading and China's Export Growth to Japan

4.1 Background

Japan and China are the two Asian countries whose political and economic affairs draw perhaps most attention from the international community today. Shifting its policy from one that relied on the centralized planning function to a more market-driven one after the detrimental Cultural Revolution, China has been achieving remarkably high economic growth, represented as 11.1% GDP growth on a nominal basis in 2003,²⁰ and is expected to play a central role in Asia in the twenty-first century. On the other hand, Japan has the second largest economy in the world today, after the United States. Since Japan is the only Asian country that has achieved economic growth on par with the western countries and has always been the front-runner in Asia's economy, its trends have significant impacts on neighboring countries as well.

The economic tie between Japan and China is stronger today than ever. After 27 years of having no diplomatic relation since WWII, the two countries finally agreed on establishing diplomatic relations in 1972, and since then, economic ties have been strengthened in spite of occasional disruptions caused by political tensions.

4.2 Debates on the Driver of China's Export Growth

China, among other Asian countries with high economic growth, has observed an astonishing rate of GDP growth, along with that of export expansion (Figure 4.1), and its exports

²⁰ International Monetary Fund. *International Financial Statistics Yearbook 2002, 2004 and May 2005*. (Qtd. in ASEAN-Japan Statistical Pocketbook 2005)

to Japan have also more than doubled in less than a decade (Figure 4.2). Yet contentious debate exists about whether China's rapid growth is based on comparative advantages or not.

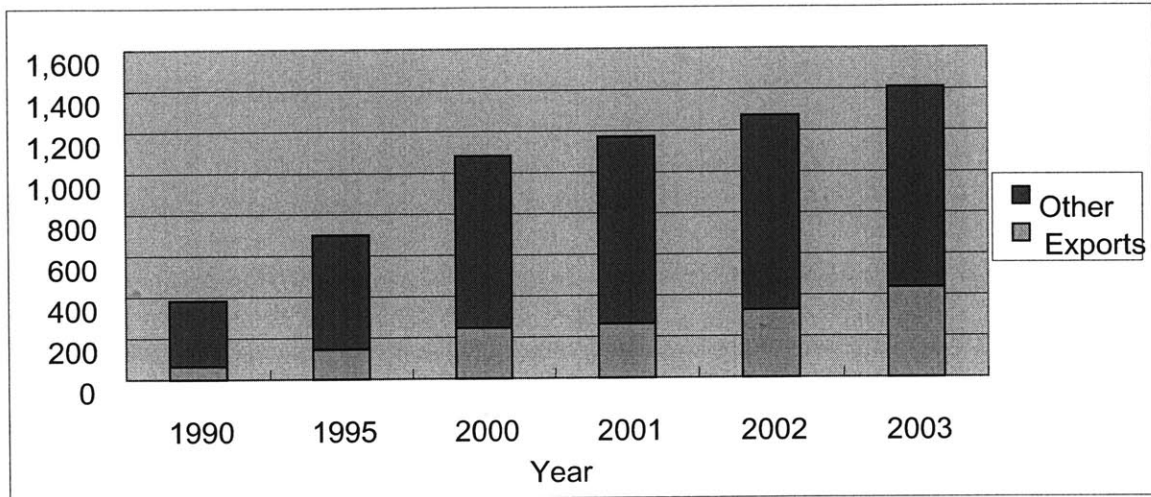


Figure 4.1 Proportion of Exports in China's GDP (USD billion)

Source: International Monetary Fund. *International Financial Statistics Yearbook 2002, 2004 and May 2005*; *Direction of Trade Statistics Yearbook 1987, 1997, 2002 and 2004*. (Qtd. in ASEAN-Japan Statistical Pocketbook 2005)

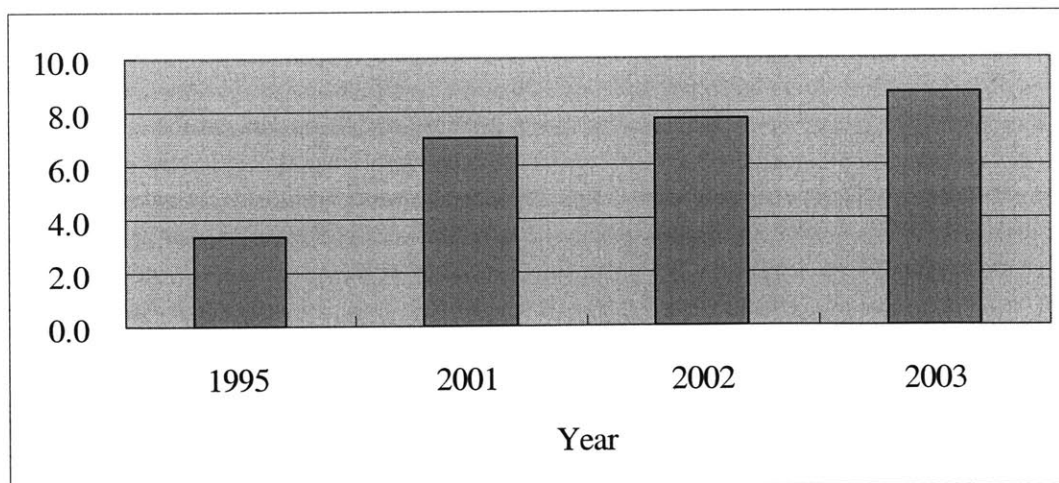


Figure 4.2 China's Exports to Japan 1995 – 2003 (JPY trillion)

Source: Japan Tariff Association. *The Summary Report on Trade of Japan 2003.12*; Japan Tariff Association. *Japan Exports & Imports 2003.12* (Qtd. in ASEAN-Japan Statistical Pocketbook 2005)

Table 4.1 shows the details of China's exports to Japan. Machinery and equipment dominate more than one-third of China's exports to Japan, approximately half of which are either office machinery or audio/visual apparatus, which are labor-intensive and generate lower profit per unit.

Table 4.1 China's Exports to Japan by Industry

	Value (JPY Billion)	% share
Machinery and Equipment	3,250.9	37.2
Textiles	2,073.2	23.7
Others	1,460.8	16.7
Food	707.5	8.1
Metal	366.1	4.2
Mineral Fuels	293.1	3.4
Chemicals	259.3	3.0
Raw Materials	161.3	1.8
Non-metallic Mineral Manufactures	158.9	1.8

Source: ASEAN-Japan Statistical Pocketbook 2005

< [http://www.asean.or.jp/eng/general/statistics/index\(05\).html](http://www.asean.or.jp/eng/general/statistics/index(05).html)>

Note: Others include wood manufacturing, furniture, travel goods, bags and similar items, and gold.

One view is that the comparative advantage drives the growth in China's export to Japan and that this trade mechanism is consistent with the flying-geese model. Kwan insists that China's growth occurs only in low-value added industries while Japan focuses on high-value added products and therefore Japan and China are not in direct price competition.²¹ Kwan's

²¹ Kwan, p. 16.

argument is consistent with the principal concept of theory of comparative advantage and the flying-geese model; China can grow without cost competitiveness but maintaining a hierarchical growth structure within the region is the key.

On the other hand, Sugawara opposes Kwan's view by claiming that the flying-geese model is no longer valid in explaining Asia's economic growth and that China competes on the basis of its strong cost competitiveness by producing labor-intensive goods.²² Sugawara no longer sees a hierarchical relation between Japan and China; China's cost competitiveness functions as the key to growth and therefore it could disrupt the flying-geese formation by catching up with Japan's economic level in the foreseeable future:

The principle of the flying-geese model is that each country takes off for economic growth with a time lag but in an orderly manner, and subsequently the region grows like a well-ordered gaggle of geese. In reality, however, this pattern has collapsed. It is apparent that China is taking advantage of direct investment to accelerate its economic growth and rapidly catching up with the advanced countries. It is almost like a 'Colliding geese pattern,' which can't be described as an improvement of orderly specialization. China's unique and locational advantages such as their inexpensive and abundant labor force and the large market create an absolute advantage that cannot be replicated by the neighboring countries.(Sugawara, p. 8)

However, identifying the level of exports' labor-intensiveness alone is insufficient in the attempt to examine whether China's comparative advantage drives its export growth and is consistent

²² Sugawara, Hideyuki. *Global Chishiki Keizai ni okeru Higashi Asia no Keizai Seichou Mechanism* [Mechanism of Economic Growth in the Global Knowledge-based Economy]. p. 8.

with the flying-geese model growth, or whether cost competitiveness drives growth and therefore disrupts the flying-geese model growth. As the previous chapter discusses, the role of the “lead goose” is essential in explaining the nature of export growth under the framework of the flying-geese model; Japan, as the lead goose, must be growing to have a new, greater comparative advantage in such a way that a comparatively disadvantaged industry would be handed over to China; otherwise the flying-geese model would collapse. Thus, the key is to examine whether Japan’s comparative advantage structure is upgrading into a new, more productive one, so that Japan would benefit from handing over its former area of specialization to China.

4.3 Productivity Improvement in Japan

Assessment of Japan’s industrial upgrading can be undertaken by examining the country’s comparative advantage changes, and this section attempts to quantify the changes in Japan’s comparative advantage and to evaluate their possible effects on China’s export growth.

Methodology

Assessment of comparative advantages was undertaken by computing productivities of different industries within a country in the 1990s and early 2000s, using OECD’s STAN Database. Productivity measures how efficiently inputs are used to produce outputs, and therefore productivity is measured by computing the ratio of output to input.

a) Output

The GDP figures were used for output values. To make the figures comparable, the GDP figures are deflated to the price level of 2003, using the OECD GDP deflator figures.²³

b) Input

Although inputs usually consist of labor and capital, this study focuses exclusively on labor inputs because capital inputs are rather exogenous and could fluctuate over a short period of time due to such activities as speculative investment. The labor force, by contrast, reflects the country's indigenous resource features in assessing countries' trade patterns. In computing labor productivity, many studies use the number of employees as labor inputs; however, calculating labor productivity based on headcounts does not consider changes in labor costs. This study uses costs that were incurred in deploying the labor force, like salaries, because hiring labor usually entails costs and a rise in labor cost should adversely affect productivity as well as comparative advantage structures. Figures on labor costs were obtained from employees' compensation information from the OECD STAN Database and deflated through the same procedure as for the output.

Trends in Output

As Figure 4.3 shows, Japan's economy has been experiencing growth on a real term since 1990, despite two years of slight decline in the late 1990s. In 2003, the Japanese GDP reached JPY 519.4 trillion, a 19% rise from 1990.²⁴

The OECD Economic Surveys: Japan explains that buoyant export growth and the progress made in restructuring the corporate sector supported the growth; this growth has

²³ *OECD Economic Outlook 78 database.*

²⁴ Author's calculation based on the OECD STAN Database.

boosted profitability and helped to attract additional investment to Japan.²⁵ The report also attributes the growth to the successful restructuring of the banking sector,²⁶ which allowed more efficient allocation of financial resources and helped create a more attractive investment climate in Japan.

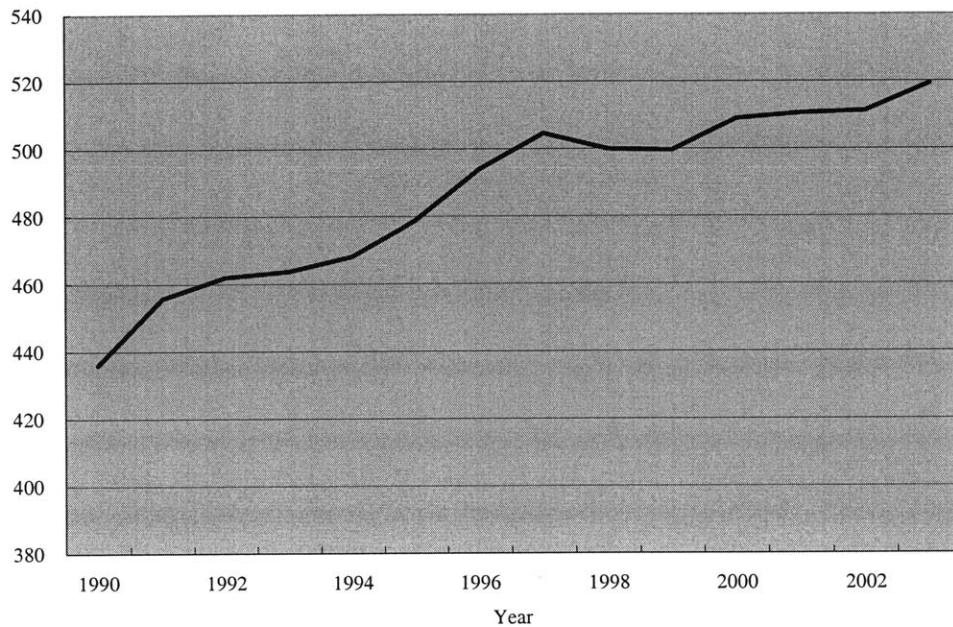


Figure 4.3 Total Output in Japan (JPY trillion)

Source: Calculated by the author based on the OECD, STAN database. www.oecd.org/sti/stan

The output growth did not take place only in terms of quantity; it accompanied a change in its structure. Just as in many other countries in post-industrialization, the economy in Japan became more dependent on the service sector, while the extent to which the agriculture and

²⁵ OECD Economic Surveys: Japan, p. 24.

²⁶ OECD Economic Surveys: Japan, p. 24.

manufacturing activities affected the economy was lessened (Figure 4.4).²⁷ Not only did the relative composition change, but the output volumes of each sector also experienced a drastic shift. Table 4.2 illustrates the real decline of the agriculture and manufacturing sectors' output.

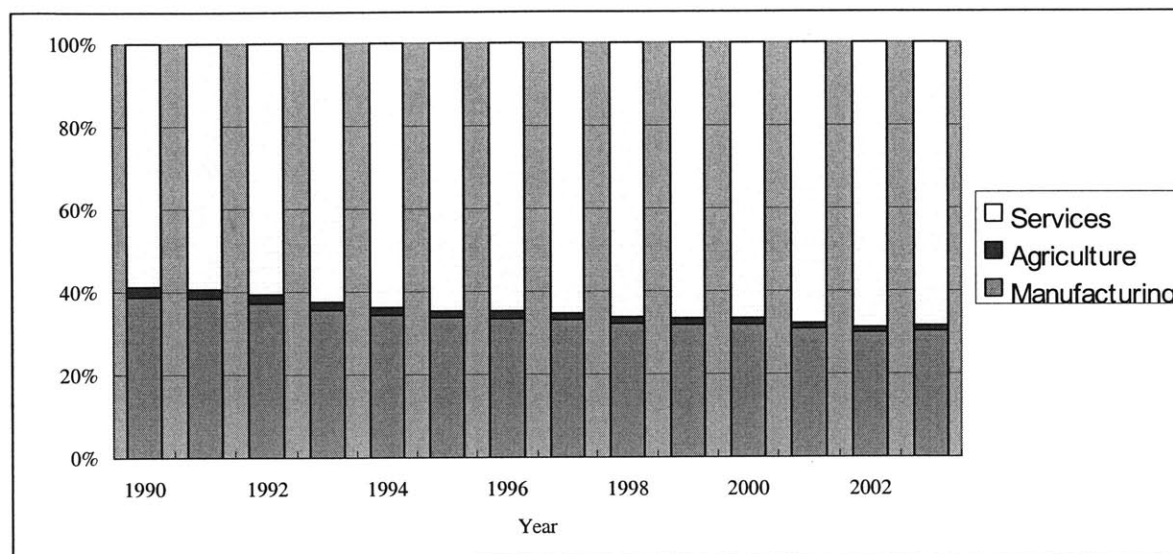


Figure 4.4 Output Structure in Japan (Percent)

Source: Calculated by the author based on the OECD, STAN database. www.oecd.org/sti/stan

Table 4.2 Japan's Output Change from 1990 to 2003

	Output (JPY trillion)		Growth Rate
	1990	2003	
<i>Total Agriculture</i>	10.5	6.5	-38.3%
<i>Total Manufacturing</i>	169.3	156.8	-7.4%
<i>Total Service</i>	256.1	356.1	39.0%
<i>Total Output</i>	436.0	519.4	19.1%

Source: Calculated by the author based on the OECD, STAN database. www.oecd.org/sti/stan

²⁷ Agriculture includes agriculture, hunting, forestry and fishing, as defined in the National Accounts data. Manufacturing includes mining and quarrying; all manufacturing; electricity, gas and water supply; and construction. Service includes wholesale and retail trade; transport, storage and communication; finance, insurance, real estate and business services; and community, social, and personal services.

Although Japan has long been known for its high-quality manufacturing, it has begun to shift its engine for growth to the service sector. Because the agriculture and manufacturing sectors' output level fell, the overall expansion of the country's output was solely supported by the growth of the service sector.

Trends in Inputs

Review of the trends in the labor input will reveal whether the change in the input was consistent with the change in the output. In fact, the increase of labor compensation of employees in Japan is much more prominent than the rise of output. In 1990, JPY 219.0 trillion was spent on labor compensation; the amount rose to JPY 265.5 trillion by 2003, an increase of 21.2%, a greater increase than the 19% rise in the output (Figure 4.5). In other words, between 1990 and 2003, Japan had to devote 21.2% additional resources to increase output by 19%.

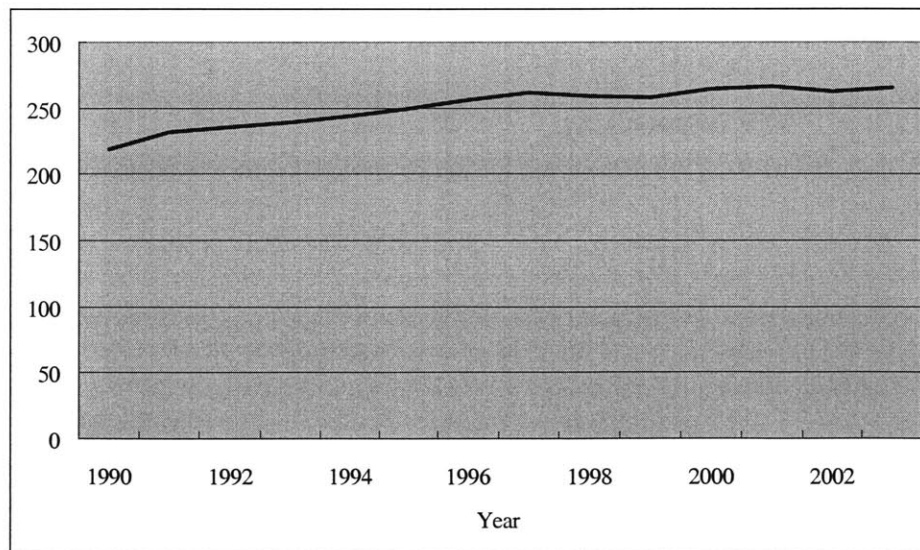


Figure 4.5 Labor Compensation of Employees in Japan (JPY Trillion)

Source: Calculated by the author based on the OECD, STAN database. www.oecd.org/sti/stan

Because the number of employees grew only by 7.4%²⁸, the majority of the increase is a result of the rise in the wage level, and the rise in the wage level is largely attributed to the aging trend in the Japanese population. As Table 4.3 shows, the higher standard age of the workforce raises the wage level, and the expansion of the older layers of Japan's population and the shrinkage of the younger layers (Figure 4.6) have been adding significantly to the countries' labor costs. The Ministry of Health, Labour and Welfare of Japan has estimated that the average wage level increased by 5% as a direct result of the aging trend and higher educational attainment.²⁹

Table 4.3 Salary by Age Groups, 2004

Age Group	Salary (JPY thousand)	
	Men	Women
Total	333.9	225.6
18 ~ 19	167.8	154.4
20 ~ 24	200.3	185.5
25 ~ 29	240.2	211.1
30 ~ 34	286.7	232.6
35 ~ 39	342.1	247.7
40 ~ 44	381.8	248.9
45 ~ 49	407.9	247.0
50 ~ 54	410.1	240.2
55 ~ 59	395.3	237.1
60 ~ 64	299.8	206.2

Source: Ministry of Health, Labor and Welfare Japan. *Explanation of Basic Survey on Wage Structure*. May 23, 2006
(<http://www.mhlw.go.jp/toukei/itiran/roudou/chingin/kouzou/z04/kekka1-2.html>)

²⁸ Calculated by the author, based on the OECD STAN Database.

²⁹ See White Paper on the Labor Economy 2002(<http://www.hakusyo.mhlw.go.jp/wpdocs/hpax200201/b0013.html>)

A breakdown of the labor costs by industry provides a more accurate reflection of the changes that have taken place (Table 4.4) by revealing the significant gaps among industries. The rise in compensation for the service sector is particularly astonishing; it increased by 33.2% in only 13 years although the output of the sector achieved a growth rate as high as 39%. While the rapid expansion of the service sector required talented workers with high-levels of knowledge and creativity, the supply of qualified labor has been limited, resulting in a significant surge at the wage level. Firms in these relatively new and rapidly changing service industries, such as finance and real estate, are competing with other firms in recruiting talented individuals and are forced to pay higher compensation than before.

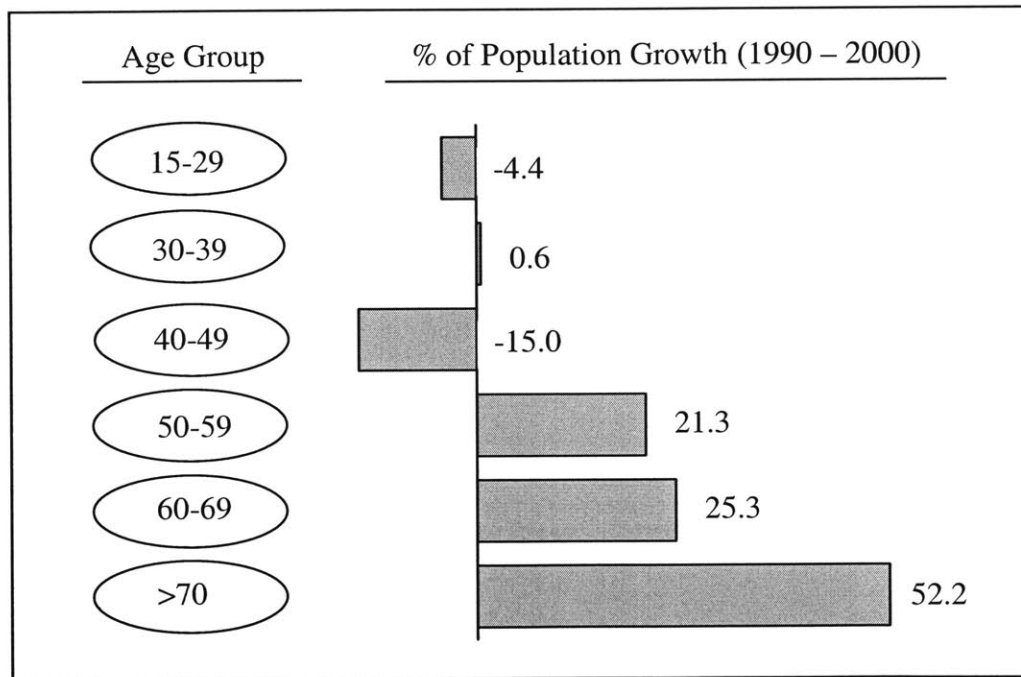


Figure 4.6 Percent of Population Growth by Age Group

Source: Statistics Bureau, Ministry of Internal Affairs and Communications.
Population Census. May 23, 2006
<http://www.stat.go.jp/data/kokusei/2000/kako/danjo/zuhyou/da02.xls>

Table 4.4 Change in Labor Costs by Industry in Japan

	Compensation for employees (JPY Trillions)		Growth Rate
	1990	2003	
<i>Total Agriculture</i>	2.1	1.91	-10.3%
<i>Total Manufacturing</i>	82.8	84.97	2.6%
<i>Total Service</i>	134.1	178.60	33.2%
<i>Total Compensation</i>	219.01	265.48	21.2%

Source: Calculated by the author based on the OECD, STAN database. www.oecd.org/sti/stan

Changes in Productivities

A significant rise in Japan's labor costs, combined with moderate output growth, should yield a fall in the economy's productivity. Figure 4.7 compares cost-based productivity against headcount-based productivity to gauge the gap between the efficiencies at which one unit of labor is utilized and also one yen is utilized in labor activities. Despite the improvement in productivity based on headcount, cost-based productivity declined, signifying that labor became more expensive at a magnitude that offsets the impact of increased productivity of individual workers. On the one hand, labor became more efficient in production; one unit of labor is able to yield higher production than before. On the other hand, firms must bear higher labor costs to hire such competent workers.

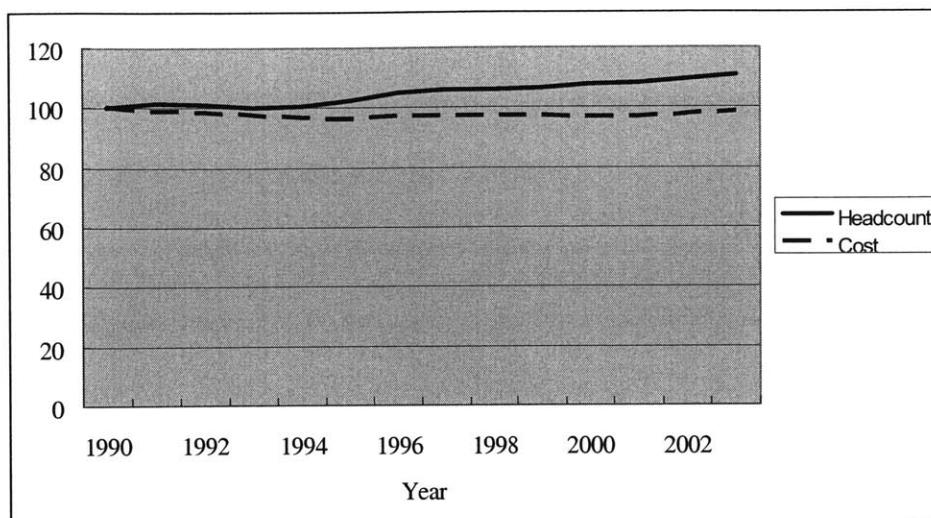


Figure 4.7 Labor Productivity Index (1990 = 100)

Source: Calculated by the author based on the OECD, STAN database. www.oecd.org/sti/stan

Note: The figures are deflated to the base year = 2003, using the GDP deflator obtained from *OECD Economic Outlook 78 database*.

Sector-level comparison of productivities provides another set of implications (Table 4.5). Both the agriculture and manufacturing sectors experienced a noteworthy reduction in the level of productivity since 1990, due to the unbalanced changes in the outputs and inputs. The inputs fell by only 10% for agriculture while its output fell by nearly 40%. For the manufacturing sector, the inputs increased by 2.6% while the outputs experienced a 7% of shrinkage. In contrast, the service sector has observed positive growth. Despite the skyrocketing growth in its labor costs, the increase in the output was above the level to sufficiently compensate for the increase in costs.

Table 4.5 Cost-based Labor Productivity by Sector (JPY output/JPY input)

	1990	2003	Growth Rate
<i>Total Agriculture</i>	4.9	3.4	-31.2%
<i>Total Manufacturing</i>	2.0	1.8	-9.8%
<i>Total Service</i>	1.9	2.0	4.4%

Source: Calculated by the author based on the OECD, STAN database. www.oecd.org/sti/stan

Note: The figures are deflated to the base year = 2003, using the GDP deflator obtained from *OECD Economic Outlook 78 database*.

4.4 Japan's Role as the Lead Goose

This section attempts a more detailed examination of Japan's comparative advantage shifts, with a focus on Japan's contribution as the lead goose to China's growth of exports. As discussed in the previous chapter, two major components contribute to the role of the lead goose: dynamic growth in new industries and smooth decline.

Dynamic growth

The productivity analysis clearly illustrates Japan's industrial upgrading; the comparative advantage shifted from agriculture and manufacturing to services. However, the service sector's growth does not appear a remarkable factor in Japan's success in industrial upgrading, mainly for the following three reasons:

First, although the productivity analysis has proved that Japan is acquiring a new comparative advantage in the service sector, the growth between 1990 and 2003 is as low as 4.4%, far below the level to compensate for the fall in the agriculture and manufacturing sectors (-31.2% and -9.8%, respectively).

Second, the productivity of the service sector is rising on the contrary in the manufacturing sector, but the service sector's productivity (JPY 2.0 output/JPY input) does not

greatly exceed that of the manufacturing sector (1.8 JPY output/JPY input) on an absolute term. The agriculture sector, which has rapidly declined both in output and productivity, still far surpasses the service sector's productivity (3.4 JPY output/JPY input for agriculture, and 2.0 JPY output/JPY input for services).

Third, the 4.4% growth in the service sector does not result from the simultaneous growth of different service industries (Table 4.6). The finance and business services experienced 15.9% improvement in its productivity, while both wholesale and retail trade and community services experienced a decline in productivity. Transport, storage, and communication observed some growth; but its increase was a mere 6.1%. These figures prove that Japan's productivity growth is supported by the finance and business service industry³⁰, which accounts for only 28% of the country's annual output. Given that many other industries are in decline, the recent growth dependent solely on one particular industry's remarkable achievement seems to entail a considerable degree of fragility.

Table 4.6 Service Sector's Cost-based Labor Productivity by Industry (JPY output/JPY input)

	1990	2003	Growth Rate	Share in GDP
Wholesale and retail trade	1.7	1.6	-1.3%	12.7%
Transport, storage and	1.6	1.7	6.1%	6.1%
Finance and business services	3.4	3.9	15.9%	27.7%
Community services	1.4	1.4	-3.7%	22.0%
<i>Total Service</i>	1.9	2.0	4.4%	

Source: Calculated by the author based on the OECD, STAN database. www.oecd.org/sti/stan

Note: The figures are deflated to the base year = 2003, using the GDP deflator obtained from *OECD Economic Outlook 78 database*.

³⁰ Finance and business service includes all types of financial intermediation, insurance and pension funding, activities related to financial intermediation, real estate activities, renting of machinery and equipment, computer and related activities, research and development, and other business activities.

Industrial upgrading is occurring in Japan, but its impact is limited and fragile. As the lead goose, Japan is not growing into the higher value-added industry at a rate that compels other countries to grow in the hierarchical formation.

Smooth Decline

The fall in the productivities and the outputs of the agriculture and manufacturing sectors make it clear that the two sectors are losing their production efficiencies and no longer play the central role in the country's economy.

As Table 4.7 shows, all the industries in the agriculture and manufacturing sectors, with the exception of electricity, gas and water supply, experienced a reduction in their productivities. Among all these industries, the decline of the general manufacturing industry³¹ appears to have the greatest impact on Japan's industrial transformation, because of its large proportion of the country's GDP (20%).

Table 4.7 Agriculture and Manufacturing Sector's Cost-based Labor Productivity by Industry (JPY output/JPY input)

		1990	2003	Growth Rate
Agriculture	Agriculture, hunting, forestry and	4.9	3.4	-31.2%
	<i>Total Agriculture</i>	4.9	3.4	-31.2%
Manufacturing	Mining and quarrying	2.5	2.1	-13.1%
	General manufacturing	2.0	1.9	-5.6%
	Electricity, gas and water supply	4.0	4.7	16.3%
	Construction	1.9	1.3	-29.8%
	<i>Total Manufacturing</i>	2.0	1.8	-9.8%

Source: Calculated by the author based on the OECD, STAN database. www.oecd.org/sti/stan

³¹ General manufacturing includes food processing, textiles, wood, pulp, chemicals, metal, machinery and transport, and more. Details can be found in the Appendix.

China's export to Japan has grown in consistency with Japan's industrial transformation (Table 4.8). Of the nine major categories of China's export to Japan, the top seven are what would be classified as general manufacturing in Japan's industrial structure. Therefore, the handover of the general manufacturing from Japan to China occurred as a result of Japan's shift in comparative advantage.

The smooth hand-over of Japan's declining industries to China has also been facilitated by Japan's active FDI in China. Japan's FDI in China was as low as JPY 51 billion in 1990 but grew tenfold by 2004, although the investment climate shriveled after the Asian Currency Crisis in the late 1990s. In 2004, China as one country received a far greater volume of FDI from Japan than all the ASEAN countries together did (Figure 4.8).

Table 4.8 China's Exports to Japan by Industry

	Value Amount (JPY million)		Growth Rate
	1995	2003	
Machinery & Equipments	485,743	3,250,933	569%
Others (Light manufacturing such as furniture and gold)	559,586	1,460,836	161%
Non-Metallic Mineral Manufactures	72,150	158,904	120%
Chemicals	124,270	259,324	109%
Metal Products	203,901	366,065	80%
Textiles	1,169,542	2,073,225	77%
Food Stuff	440,805	707,534	61%
Mineral Fuels	196,765	293,068	49%
Raw Materials	128,119	161,250	26%
GRAND TOTAL	3,380,882	8,731,139	158%

Source: ASEAN-Japan Statistical Pocketbook 2005
 < [http://www.asean.or.jp/eng/general/statistics/index\(05\).html](http://www.asean.or.jp/eng/general/statistics/index(05).html) >

Figure 4.9 clearly indicates the trend in which Japan's FDI strongly favors the manufacturing businesses in China. This investment pattern is called PROT-FDI, the type of FDI that facilitates a succeeding country's export activities, as reviewed in the previous chapter. The PROT-FDI benefits not only the Chinese firms and its investors but also Japan's entire economy because by concentrating investment in the industry in which Japan has lost its comparative advantage and thereby facilitating the industrial handover, Japan is able to reallocate its scarce resources to more productive industries. Hence, concentrating FDI in the manufacturing sector in China played a central role in undertaking the smooth handover of Japan's declining manufacturing sector to China.

It is also noteworthy that China is one of Japan's top Official Development Aid (ODA) recipients, particularly in the area of technical cooperation (Table 4.9). Technical assistance aims to transfer Japan's knowledge in numerous socio-economic development activities to China, and in 2003, China received USD 300 million, while Indonesia, the second largest recipient, received a mere USD 120 million. The technical assistance activities contributed to China's industrial development through such activities as accepting Chinese trainees, sending industry experts, and providing machinery equipment.

Japan's active FDI and aid activities facilitated "comparative advantage recycling"³² in the manufacturing sector. As Japan lost its comparative advantage in manufacturing, it equipped China with the necessary financial sources and technical capabilities to take over Japan's former comparative advantage.

³² Sugawara. p. 4; translated from Japanese to English by the author.

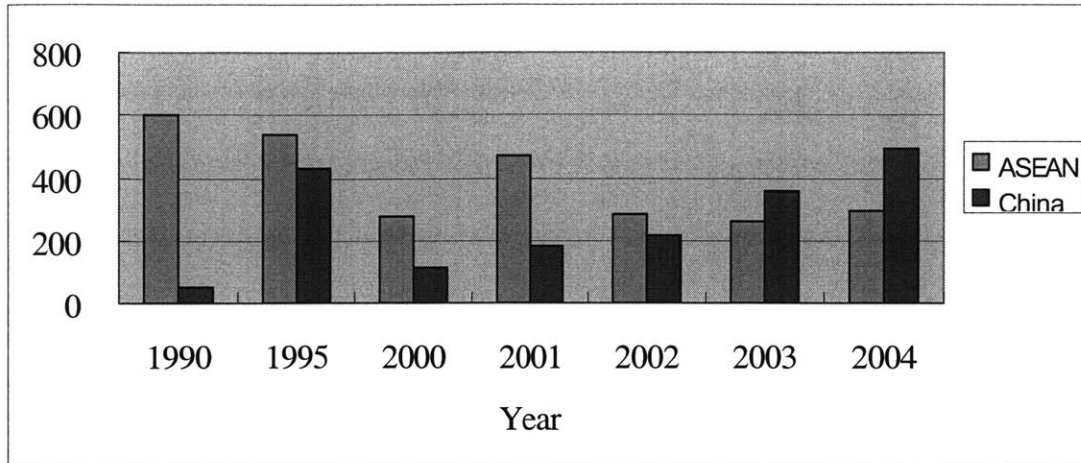
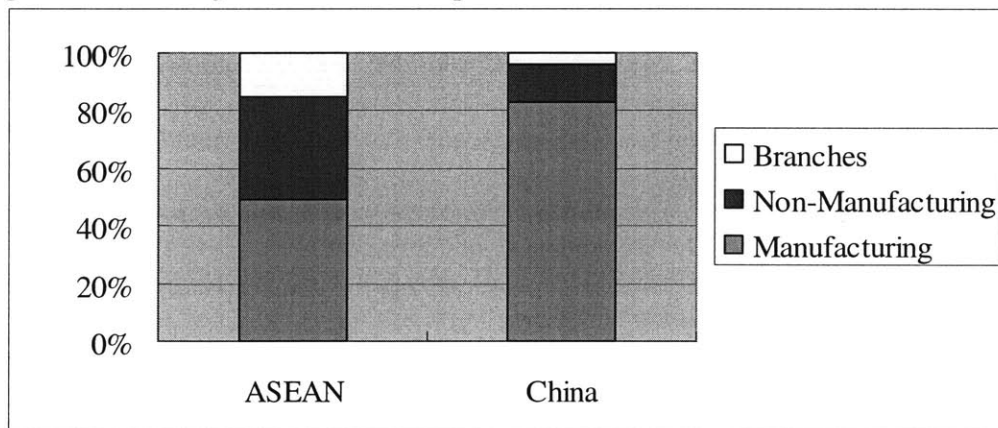


Figure 4.8 Japan's FDI in ASEAN and China (JPY Billion)

Source: Ministry of Finance Japan. *Ministry of Finance Statistics Monthly* 2004.12. (Qtd. in ASEAN-Japan Statistical Pocketbook 2005 < [http://www.asean.or.jp/eng/general/statistics/index\(05\).html](http://www.asean.or.jp/eng/general/statistics/index(05).html)>)

Figure 4.9 Industry Breakdown of Japan's FDI in ASEAN and China



Source: ASEAN-Japan Statistical Pocketbook 2005

< [http://www.asean.or.jp/eng/general/statistics/index\(05\).html](http://www.asean.or.jp/eng/general/statistics/index(05).html)>

Table 4.9 Recipient Countries of Japan's ODA Categorized by Type

<u>Technical Cooperation</u>		<u>Loan Aid</u>		<u>Grant Aid</u>	
	Amount (USD)		Amount (USD)		Amount (USD)
China	300.13	Indonesia	938.76	Afghanistan	107.09
Indonesia	120.66	China	386.96	Bangladesh	94.63
Philippines	91.53	Philippines	367.53	Indonesia	82.36
Vietnam	83.63	Vietnam	347.43	Cambodia	76.68
Thailand	73.85	India	304.66	China	72.63
Korea	60.6	Pakistan	191.75	Philippines	69.72

Source: Ministry of Foreign Affairs Japan. Japan's ODA White Paper. (Qtd. in Nippon Kokusei Zue 2005/1006).

Japan was extremely successful in playing the role of the lead goose in handing over its declining industries. Not only did its significant downturn in manufacturing provide a window of opportunity for China to take over the industry, but Japan's financial and knowledge transfer to China was concentrated in the manufacturing activities in China, and consequently, China's manufacturing sector flourished in the global market.

4.5 Effects of Japan's Industrial Upgrading on China's Export Strategies

The analysis suggests that Japan's industrial focus is shifting from manufacturing towards services and that the division of labor is in progress. However, this specialization pattern and the following growth of exports cannot be fully explained by the theory of comparative advantage and the flying-geese model alone, given Japan's slow pace of upgrading and low productivity in comparison with declining sectors on an absolute term.

The industrial handover was initiated because of Japan's downturn in manufacturing, but its growth into the higher value-added industries has not achieved a level sufficient to allow China to trade without having cost competitiveness. Nearly one-third of Japan's GDP is still in the manufacturing where the productivity improvement is negative, and the total labor cost in the

manufacturing sector is increasing although the output is falling. Without creating a larger market for more potential service industries, the country's remaining resources would simply stay in the manufacturing sector.

Because of Japan's partial yet tenacious presence in manufacturing, China is exposed to the direct price competition with Japan. Under constant cost pressure, China can compete with Japan only in the sectors where they have an absolute advantage---labor-intensive industries, where their abundant and low-cost labor is the strongest value proposition. Without this labor cost advantage, their products would not be able to compete with Japanese industries. Therefore, Japan's further productivity growth in the service sector clearly would be the key in fostering China's growth in comparative advantage-based exports.

So long as China's abundant labor force is available, the country can compete in price in these labor-intensive industries like general manufacturing, and it is even leapfrogging over Japan in the labor-intensive industries. However, for China to engage in more sophisticated production, in which abundant labor would not be an invincible weapon, Japan would need to acquire a greater comparative advantage in the service sector and reallocate its labor from manufacturing to services. This further industrial upgrading would promote further division of labor and allow China to specialize in more sophisticated production based on their comparative advantages.

4.6 Conclusion

The case study demonstrates that the handover of the manufacturing sector from Japan to China can be attributed to Japan's industrial upgrading from manufacturing to services. However, the upgrading is so slow and minimal that the full handover is still in progress, and China

directly competes with the Japanese manufacturing industries; China's export growth was not based on comparative advantages but was based on China's labor cost competitiveness.

Because the flying-geese growth model is based on the premise that the continuous and high-speed growth of the lead-geese pulls the following geese's export activities, Japan's slow upgrading has decelerated the flying-geese transformation. Without further acceleration of Japan's industrial upgrading, China could not grow into more sophisticated production and would only benefit from staying in the labor-intensive manufacturing sector.

The next chapter elaborates on the policy implications that can be drawn from this case study as well as the theoretical reviews conducted in the previous chapters. The chapter also examines the possible scenarios for the growth of exports in the developing countries in Asia.

Chapter 5

Conclusion:

Implications for the Growth of Exports in Developing Countries in Asia

Several key implications can be observed from the theoretical and empirical reviews for understanding factors underlying the growth of exports in developing countries with particular reference to Asia. Most prominently, the reviews have proven that the theory of comparative advantage is not valid in every circumstance; the theory entails several conditions that are difficult to assume in real economies, and sound policies are required to foster the growth of exports in developing countries based on their comparative advantages.

This chapter highlights the limitations of applying the theory of comparative advantage and also presents possible growth scenarios for developing countries when the theory of comparative advantage fails to foster growth of their exports.

5.1 Limitations of the Theory of Comparative Advantage

The theoretical reviews revealed that comparative advantage can drive a country without cost competitiveness to growth of exports on the condition that a hierarchical mechanism exists in which an advanced country creates demand for further specialization through industrial upgrading and imports from the developing country. When the advanced country's need for further specialization decelerates, the developing country would be compelled into cost competition with the advanced country. In other words, cost competitiveness would be a prerequisite for a developing country to grow in bilateral trade when the export partner's industrial upgrading decelerates.

This argument is supported by the empirical study on China's export to Japan. The study confirms that China's export growth was pulled by Japan's industrial structure transformation—from one dependent upon manufacturing to one that makes the most value out of services. Despite the rapid expansion of the output of the service sector, however, the rising wage level has exacerbated the sector's productivity, and Japan's acquisition of a new comparative advantage in the service sector is not fully compensating for the decline in the manufacturing sector's productivity. Because of this slow pace of Japan's industrial upgrading, a considerable proportion of the country's labor input still remains in the unproductive manufacturing sector, exposing China to a direct competition with Japan.

For a developing country to grow by exporting to an advanced country based on comparative advantage, the advanced country must reallocate its resources from a declining sector to a more productive sector so that the developing country can take over the declining sector without directly competing with the advanced country. In reality, however, the rising wages in the service sector of advanced countries are adversely affecting the countries' overall productivity improvement and their transformation of industrial structure. The declining productivity of the service sectors suggests that as advanced countries attempt to shift their focus to knowledge-based economic activities, qualified labor, the single most important resource, becomes scarcer and therefore expensive. The U.S., the most knowledge-dependent country, also faces the problem of rising labor costs. Between 1990 and 2000, no single sector in the U.S. experienced productivity growth³³.

Although strategies for the growth of exports from a developing country are often discussed with particular focus on the developing country's production abilities, developing

³³ Calculated by the author, using the OECD STAN Database.

countries would need to examine the possible linkages with the industrial upgrading of advanced countries.

5.2 Need for the Advanced Countries' Growth in Fostering Growth of Developing Countries

One of the key lessons learned from the case study is that when the stagnation in the advanced country's industrial upgrading impedes smooth industrial handovers, a developing country needs abilities to produce with higher productivity than an advanced country to export goods. In other words, the developing country can export provided that it can offer goods and services at a lower price than the advanced country when smooth industrial handovers are not occurring.

In pursuing cost competitiveness thus far, China has successfully leveraged its abundant and low-cost labor and specialized in labor-intensive production with low value-added. This trend is expected to continue so long as a sufficient pool of surplus labor in rural areas can be dispatched for labor-intensive production, such as low-tech manufacturing, without significantly raising wages.³⁴ China's unique strength in abundant labor would help the country leapfrog even within the region, surpassing several ASEAN countries whose quests for economic prosperity have far longer histories than China. However, the landscape could grow difficult when China attempts further advancement into a higher-value-added industry where the existence of surplus labor would no longer be as solidly the source of cost competitiveness as in low-tech manufacturing.

Because of the absolute gap between Japan's and China's production capabilities, China is not likely to acquire cost competitiveness on par with Japan or other advanced countries in

³⁴ Kwan, p. 15.

higher-value-added industries over a short period of time. Therefore, the theory of comparative advantage would play a greater role when the developing country makes an attempt at higher-value-added production. The developing country would be able to grow without cost competitiveness only when the advanced country continues to acquire new comparative advantages and hand over its declining industry to the developing country.

5.3 Sound Policies for Growth and Decline

Few developing countries have cost competitiveness that would allow them to compete in the global or regional market unless they have unique geographic advantages like crude resources. Therefore, trade activities based on the theory of comparative advantage are essential in order for these countries to grow by export activities, with aspirations to ultimately catch up with advanced countries in high-value-added industries.

Many of the traditional policies for the economic growth of developing countries primarily focused on nurturing the developing countries' abilities to produce and consume; however, this research has demonstrated the fact that it is essential to implement sound policies to promote industrial handovers from advanced countries to developing countries, through creating a hierarchical mechanism in which advanced countries grow in more productive industries. At the same time, policies should encourage developing countries to specialize in the declining industries of these advanced countries.

The notion of growth cannot be described simply as an increase in the quantity of economic activities. Rather, the quality of the industrial structure indicates a country's growth, and it is the improvement in the productivity and the following industrial upgrading that represent the country's quality of industrial structure. The case study indicated that Japan has

been successful in expanding its output, but the success comes simply as a consequence of an increase in their input. In order for successful industrial upgrading, the advanced country's economic activities would need to grow in innovative industries, where production takes place with higher productivity.

The case study also shed light on the effect of the advanced country's FDI and aid policies as strategies to smoothly hand over its declining industries. Effectively directing FDI and aid activities in the industries where the advanced country is losing its comparative advantage equips the developing country with knowledge and technologies necessary to take over the advanced country's declining industries, expediting the handover processes.

5.4 Conclusion

Many of today's debates on the development economics seem to observe the developing country's competitiveness in production as the essential factor for its export growth. The impact that could be expected by pursuing this scenario, however, seems limited, because the developing country's only source of cost competitiveness is its abundant labor, and labor can only help the country flourish in the labor-intensive, low-value-added industries. In pursuit of developing countries' further growth in higher-value-added industries, there must be a hierarchical mechanism in which the developing country takes over industries from advanced countries in such a way that the two countries' comparative advantages would be most effectively leveraged.

Discussions about strategies for the export-driven economic growth of developing countries, therefore, must entail examinations of the advanced countries' industrial upgrading and of the following industrial handovers in the region as two of the most important drivers for

the developing country's export growth. To answer the central question, cost competitiveness is not a prerequisite for the growth of exports in developing countries, on the conditions that the advanced countries' industrial upgrading allows the developing country to specialize based on the theory of comparative advantage and that sound policies are required to fulfill this critical condition for the region's economic prosperity.

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Appendix C: JAPAN Labour productivity (JPY Output / JPY Labor Input)

JPY billions

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
GRAND TOTAL	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
AGRICULTURE, HUNTING, FORESTRY AND FISHING	4.9	4.9	4.8	4.4	4.8	4.5	4.4	3.9	4.0	3.7	3.6	3.4	3.4	3.4
AGRICULTURE, HUNTING AND FORESTRY	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FISHING	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MINING AND QUARRING	2.5	2.4	2.4	2.2	1.9	2.0	2.1	2.0	1.8	1.6	1.6	1.8	1.9	2.1
MINING AND QUARRING OF ENERGY PRODUCING MATERIALS	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MINING AND QUARRING EXCEPT ENERGY PRODUCING MATERIALS	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL MANUFACTURING	2.0	2.0	1.9	1.9	1.8	1.8	1.9	1.9	1.8	1.8	1.9	1.8	1.8	1.9
FOOD PRODUCTS, BEVERAGES AND TOBACCO	2.4	2.2	2.4	2.4	2.3	2.3	2.2	2.2	2.2	2.4	2.4	2.4	2.3	2.3
FOOD PRODUCTS AND BEVERAGES	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOBACCO PRODUCTS	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TEXTILES, TEXTILE PRODUCTS, LEATHER AND FOOTWEAR	1.4	1.4	1.4	1.4	1.3	1.3	1.4	1.3	1.4	1.4	1.5	1.4	1.4	1.4
TEXTILES AND TEXTILE PRODUCTS	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TEXTILES	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WEARING APPAREL, DRESSING AND DYING OF FUR	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LEATHER, LEATHER PRODUCTS AND FOOTWEAR	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WOOD AND PRODUCTS OF WOOD AND CORK	1.6	1.6	1.6	1.6	1.5	1.6	1.5	1.5	1.5	1.6	1.5	1.4	1.4	1.4
PULP, PAPER, PAPER PRODUCTS, PRINTING AND PUBLISHING	1.7	1.7	1.6	1.6	1.6	1.6	1.7	1.6	1.6	1.5	1.6	1.6	1.6	1.6
PULP, PAPER AND PAPER PRODUCTS	2.2	2.1	2.0	2.1	1.9	2.0	2.0	1.9	2.0	2.1	2.2	2.1	2.0	2.1
PRINTING AND PUBLISHING	1.5	1.5	1.4	1.4	1.5	1.5	1.5	1.5	1.3	1.4	1.4	1.4	1.4	1.4
CHEMICAL, RUBBER, PLASTICS AND FUEL PRODUCTS	3.5	3.5	3.6	3.6	3.5	3.6	3.7	3.7	3.6	3.8	3.7	3.8	3.9	4.0
COKE, REFINED PETROLEUM PRODUCTS AND NUCLEAR FUEL	14.2	15.8	16.1	16.2	16.5	16.6	18.4	19.4	18.5	20.7	22.7	25.6	28.8	28.8
CHEMICALS AND CHEMICAL PRODUCTS	3.1	3.0	3.1	2.9	2.8	3.0	3.1	2.9	2.8	3.0	2.8	2.7	2.8	2.9
CHEMICALS EXCLUDING PHARMACEUTICALS	2.9	2.7	2.8	2.6	2.5	2.7	2.7	2.5	2.6	2.4	2.3	2.4	2.4	2.4
PHARMACEUTICALS	3.9	3.6	3.8	3.8	3.6	3.8	4.0	3.7	3.5	4.1	3.8	3.9	3.9	4.1
RUBBER AND PLASTICS PRODUCTS	1.5	1.6	1.5	1.5	1.5	1.3	1.2	1.3	1.5	1.4	1.4	1.3	1.2	1.3
OTHER NON-METALLIC MINERAL PRODUCTS	1.8	1.7	1.8	1.8	1.7	1.8	1.8	1.7	1.6	1.7	1.7	1.7	1.7	1.7
BASIC METALS, METAL PRODUCTS, MACHINERY AND EQUIPMENT	1.9	1.9	1.8	1.7	1.6	1.7	1.7	1.7	1.7	1.6	1.6	1.6	1.6	1.6
BASIC METALS AND FABRICATED METAL PRODUCTS	2.0	2.0	1.9	1.8	1.7	1.8	1.8	1.9	1.7	1.7	1.7	1.7	1.6	1.7
BASIC METALS	2.6	2.6	2.5	2.3	2.3	2.5	2.5	2.5	2.3	2.3	2.4	2.3	2.3	2.6
IRON AND STEEL	2.6	2.6	2.5	2.3	2.3	2.4	2.4	2.5	2.2	2.2	2.4	2.4	2.4	2.7
NON-FERROUS METALS	2.8	2.8	2.5	2.5	2.3	2.5	2.7	2.5	2.6	2.6	2.6	2.3	2.3	2.4
FABRICATED METAL PRODUCTS, except machinery and equipment	1.5	1.6	1.5	1.4	1.3	1.3	1.4	1.4	1.4	1.3	1.3	1.2	1.2	1.1
MACHINERY AND EQUIPMENT	1.8	1.8	1.7	1.6	1.6	1.6	1.7	1.7	1.6	1.6	1.6	1.5	1.4	1.5
MACHINERY AND EQUIPMENT, N.E.C.	1.7	1.7	1.7	1.5	1.5	1.5	1.5	1.5	1.4	1.3	1.3	1.3	1.2	1.3
ELECTRICAL AND OPTICAL EQUIPMENT	1.8	1.9	1.7	1.7	1.7	1.7	1.7	1.8	1.7	1.7	1.8	1.6	1.5	1.6
OFFICE, ACCOUNTING AND COMPUTING MACHINERY	2.4	2.4	2.2	2.0	2.0	2.1	2.2	2.1	2.1	1.8	1.8	1.7	1.5	1.5
ELECTRICAL MACHINERY AND APPARATUS, NEC	1.5	1.6	1.5	1.5	1.4	1.4	1.4	1.5	1.4	1.4	1.4	1.3	1.3	1.2
RADIO, TELEVISION AND COMMUNICATION EQUIPMENT	2.1	2.1	1.9	1.8	1.9	1.9	2.0	2.0	1.9	2.0	2.3	1.8	1.8	2.0
AGRICULTURAL, PRECISION AND OPTICAL INSTRUMENTS	1.5	1.5	1.5	1.4	1.3	1.4	1.4	1.4	1.5	1.4	1.4	1.5	1.4	1.4
TRANSPORT EQUIPMENT	1.9	1.9	1.8	1.7	1.6	1.7	1.7	1.6	1.8	1.8	1.8	1.8	1.9	1.9
MOTOR VEHICLES, TRAILERS AND SEMI-TRAILERS	1.9	1.9	1.8	1.7	1.6	1.7	1.6	1.7	1.8	1.8	1.8	1.7	1.9	1.9
OTHER TRANSPORT EQUIPMENT	1.5	1.6	1.6	1.7	1.7	1.7	1.5	1.7	2.0	1.8	1.8	1.9	1.9	1.8
BUILDING AND REPAIRING OF SHIPS AND BOATS	1.5	1.6	1.7	1.8	1.8	1.8	1.5	2.0	2.5	1.9	2.2	2.0	2.0	2.1
AIRCRAFT AND SPACECRAFT	1.1	1.3	1.3	1.3	1.3	1.4	1.4	1.4	1.8	1.5	1.4	1.8	1.8	1.4
RAILROAD EQUIPMENT AND TRANSPORT EQUIPMENT N.E.C.	2.0	2.0	1.9	1.9	1.9	1.9	1.8	1.6	1.5	2.0	1.8	1.8	1.8	1.8
MANUFACTURING NEC, RECYCLING	1.9	1.8	1.8	1.7	1.6	1.6	1.6	1.5	1.6	1.5	1.6	1.5	1.5	1.5
MANUFACTURING NEC	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RECYCLING	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ELECTRICITY, GAS AND WATER SUPPLY	4.0	4.0	4.1	4.0	4.0	4.0	4.2	4.3	4.4	4.4	4.5	4.6	4.6	4.7
ELECTRICITY, GAS, STEAM AND HOT WATER SUPPLY	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COLLECTION, PURIFICATION AND DISTRIBUTION OF WATER	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CONSTRUCTION	1.9	1.8	1.7	1.6	1.5	1.4	1.4	1.4	1.4	1.4	1.3	1.3	1.3	1.3
WHOLESALE AND RETAIL TRADE, RESTAURANTS AND HOTELS	1.7	1.7	1.7	1.7	1.8	1.8	1.8	1.8	1.8	1.7	1.6	1.6	1.7	1.6
WHOLESALE AND RETAIL TRADE, REPAIRS	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SALE, MAINTENANCE AND REPAIR OF MOTOR VEHICLES, RETAIL SALE OF	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WHOLESALE, TRADE & COMMISSION EXCL. MOTOR VEHICLES	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RETAIL TRADE EXCL. MOTOR VEHICLES, REPAIR OF HOUSEHOLD GOODS	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HOTELS AND RESTAURANTS	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TRANSPORT AND STORAGE AND COMMUNICATION	1.6	1.6	1.6	1.6	1.6	1.6	1.7	1.7	1.7	1.6	1.6	1.7	1.7	1.7
TRANSPORT AND STORAGE	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.4	-	-	-	-	-
LAND TRANSPORT, TRANSPORT VIA PIPELINES	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WATER TRANSPORT	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AIR TRANSPORT	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SUPPORTING AND AUXILIARY TRANSPORT ACTIVITIES	-	-	-	-	-	-	-	-	-	-	-	-	-	-
POST AND TELECOMMUNICATIONS	2.2	2.2	2.2	2.2	2.3	2.4	2.7	2.8	2.9	-	-	-	-	-
FINANCE, INSURANCE, REAL ESTATE AND BUSINESS SERVICES	3.4	3.3	3.3	3.4	3.4	3.3	3.4	3.4	3.4	3.5	3.6	3.7	3.8	3.9
FINANCIAL INTERMEDIATION	1.9	1.9	1.9	1.9	2.1	2.1	2.1	2.2	2.2	2.3	2.4	2.6	2.7	2.9
FINANCIAL INTERMEDIATION except insurance and pension funding	-	-	-	-	-	-	-	-	-	-	-	-	-	-
INSURANCE AND PENSION FUNDING, except compulsory social security	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ACTIVITIES RELATED TO FINANCIAL INTERMEDIATION	-	-	-	-	-	-	-	-	-	-	-	-	-	-
REAL ESTATE, RENTING AND BUSINESS ACTIVITIES	4.7	4.3	4.2	4.3	4.1	4.1	4.1	4.0	4.1	4.2	4.3	4.3	4.3	4.5
REAL ESTATE ACTIVITIES	15.5	15.3	15.7	17.0	16.6	17.2	17.5	17.6	17.9	19.9	19.2	21.0	21.4	21.7
RENTING OF M&EQ AND OTHER BUSINESS ACTIVITIES	2.0	1.9	1.9	1.8	1.7	1.8	1.8	1.7	1.8	1.8	1.9	1.8	1.8	1.9
RENTING OF MACHINERY AND EQUIPMENT	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COMPUTER AND RELATED ACTIVITIES	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RESEARCH AND DEVELOPMENT	-	-	-	-	-	-	-	-	-	-	-	-	-	-
OTHER BUSINESS ACTIVITIES	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COMMUNITY SOCIAL AND PERSONAL SERVICES	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
PUBLIC ADMIN. AND DEFENCE, COMPULSORY SOCIAL SECURITY	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EDUCATION	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HEALTH AND SOCIAL WORK	-	-	-	-	-	-	-	-	-	-	-	-	-	-
OTHER COMMUNITY, SOCIAL AND PERSONAL SERVICES	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PRIVATE HOUSEHOLDS WITH EMPLOYED PERSONS	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EXTRA-TERRITORIAL ORGANIZATIONS AND BODIES	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Agriculture	4.9	4.9	4.8	4.4	4.8	4.5	4.4	3.9	4.0	3.7	3.6	3.4	3.4	3.4
Manufacturing	2.0	2.0	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Services	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0

Source: Calculated by the author, based on the OECD STAN Database