Chapter 4

Logistics firms, market sizes and transport costs - Logistics and industrial location in East Asia -

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1 INTRODUCTION

Freight transports in East Asia have been developing extreme rapidly in the decades. It is come from the great expansion of trade and investment. As available markets expanded and production bases dispersed to several countries along with production processes, the trade volume has been growing rapidly.

Industrial firms have been pursuing the optimal production, distribution, and location choice of their factories, given their circumstances. Multinational firms have expanded their distribution networks. They have also been dividing their products and production process. The production processes with labor intensive technologies tend to move to less developed countries or regions, and the process with capital intensive technologies remain in developed countries.

We also saw great development of infrastructure including international roads, international ports and airports. Governments in developing countries have been improving their trunk roads international ports and airports. They have also been promoting Free Trade Zone (FTZ) or Export Processing Zone (EPZ) and invite multinational firms.

The logistics firms also had important roles. They have handled international intermodal freight transports. They have been improving their operation, seeking new markets and opportunities to make profits.

This paper analyzes logistics performance in East Asia and the role of logistics firms. We focus on the several factors influencing transport costs. We use a model based on the new economic geography and conduct a numerical simulation. We discuss how the existence of logistics firms would affect the trade pattern and whether small market would benefit from the existence of logistics firms. It is useful because not only de facto

economic integration by multinational firms but also de jure economic integration like FTAs are now taking in the small less developed countries like Cambodia, Laos, and Vietnam.

The economic geography describes the relationship between the agglomeration forces and the dispersion forces. The important factors in the new economic geography are increasing retunes to scale in manufacturing sectors, movement of production factors across regions, immobile demand or some congestion effects, and broadly defined transport costs among regions. When transport costs are sufficiently high, the mobile production factors may disperse because the existence of immobile demand will attract the mobile factors. As transport costs decrease, the mobile production factors prefer agglomeration because locating near large markets becomes profitable. This is the standard mechanism of core-periphery model.

The standard models of new economic geography use iceberg-type transport costs (Krugman 1991 and Fujita, Krugman and Venables 1999) or fixed amount of numeraire (Ottaviano *et al.* 2002). They mainly focus on the location choice of firms or skilled labors and think neither logistics firms nor scale economy in transport technologies[1].

We also discuss the issues of back-hauling. If there are trade imbalances, logistics firms have to run empty tracks. Running empty tracks decreases profitability. It is said that Bangkok-Hanoi route using East-West Economic Corridor has a great potential while there are the problems of trade imbalance between Thailand and Laos, and Laos and Vietnam. It is also said that Vietnam has a large demand for the intermediate parts and components from China while there is a trade imbalance on land transport for manufacturing goods between China and Vietnam. We will see logistics firms may mitigate the imbalance of demand and accelerate the trade opening.

This paper is organized as follows. In Sections 2, we outline the logistics performance in East Asia. In Section 3, we summarized several factors influencing transport costs and factors influencing changes in transport costs in East Asia. In Section 4, a model of two regions is set up and relationship among physical condition of infrastructure, logistics firms, and industrial firms are examined by numerical simulation.

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[1] Mori and Nishikimi (2002) discussed the scale economy in transport costs. Takahashi (2007) introduced the transport sector with back-hauling and scale economy using modified version of Forslid and Ottaviano (2003).

2. LOGISTICS PERFORMANCES IN EAST ASIA

Logistics in East Asia have been developing extreme rapidly in recent decades. We can see the rapid increase of interregional and intraregional trade. Ohzeki (2008) pointed the characteristics of trade of East Asian countries.

One prominent factor is the trade by China. In 1995, China imported 28 billion dollars from Japan, 9 billion dollars from ASEAN countries, and 10 billion dollars from South Korea. In 2005, they increased to 99 billion dollars from Japan, 72 billion dollars from ASEAN, and 73 billion dollars from South Korea. Exports have also increased. From 1995 to 2005, China exported from 36 billion dollars to 107 billion dollars to Japan, from 11 billion dollars to 58 billion dollars to ASEAN, from 7 billion dollars to 38 billion dollars to South Korea respectively.

The trade imbalances between China and NAFTA or China and EU become serious issues. In 2005, China imported 58 billion dollars from NAFTA where NAFTA imported 301 billion dollars from China. China imported 71 billion dollars from EU15 and EU15 imported 195 billion dollars from China.

Another prominent factor is the trade of intermediate parts and components in China and ASEAN countries. In 2005, the share of parts and components in the imports of NAFTA was less than 20% from China and EU15, and less than 30% from Japan, Korea, and ASEAN. The share of parts and components in the imports of EU was less than 20% from China and less than 30% from Japan, Korea, ASEAN, and NAFTA. The share of parts and components in the imports of Japan was also relatively low. However, the share of parts and components in the imports of China was more than 30% from Japan and Korea, and more than 40% from ASEAN. The share of parts and components in the imports of ASEAN was more then 30% from China and EU15, and more than 40% from Japan, Korea and NAFTA. We can find China and ASEAN countries import a lot of intermediate parts and components, and export a lot of final goods, especially to NAFTA and EU.

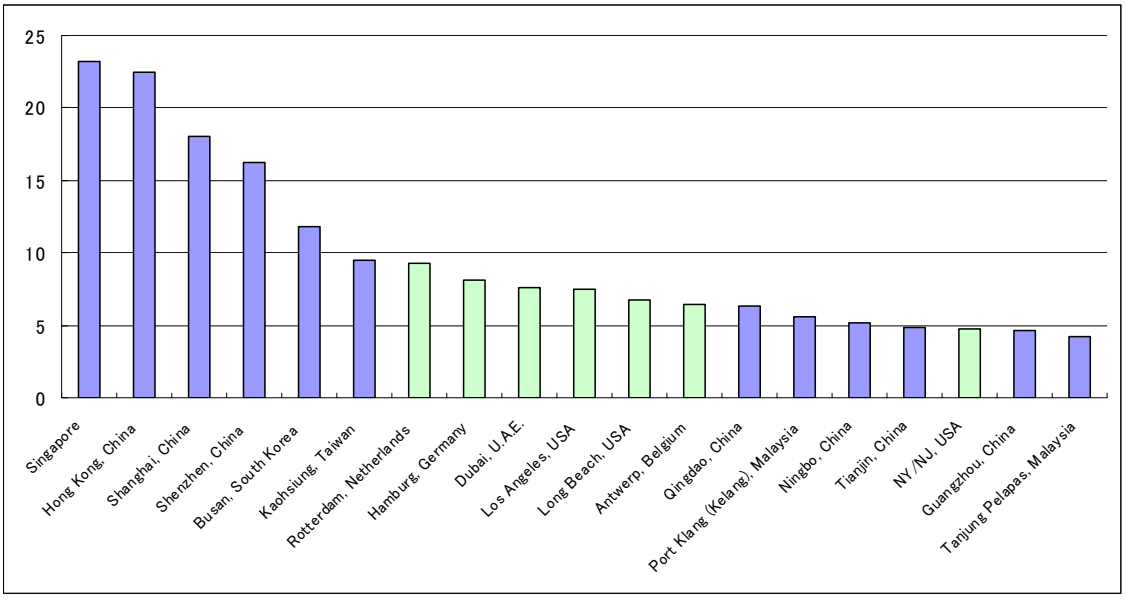
The key actors are the multinational firms. They have been dividing their products and production process. The products or production processes with labor intensive technologies tend to move to less developed countries or regions with cheaper wages, and the products or processes with capital intensive technologies remain in developed

countries. As places of factories dispersed to several countries along with production processes, the trade volume has been growing rapidly.

We can see from ports by container traffic that East Asia increases in importance on freight transport (Figure 1). In 2005, the top six ports in the world are in East Asia. From 1996 to 2005, the container traffic handled in Shanghai ports increased by 820%, that in Shenzhen increased 2650%. The port of Tanjun Pelapas became in top 20 ports in the world while it handled only 0.02 million TEUs in 1999.

Singapore, Hong Kong, and Shanghai became the transport hub in the region. They enjoy large scale economy in freight transport. We can find agglomeration of freight handling to small number of ports. The Japanese ports have been losing importance in recent decades. It is partly because the delay in expansion of container terminal, high wages in freight handling and change in industrial structures to more high value-added, time conscious products.

Figure 1: Ports by container traffic (Million TEUs, 2005)



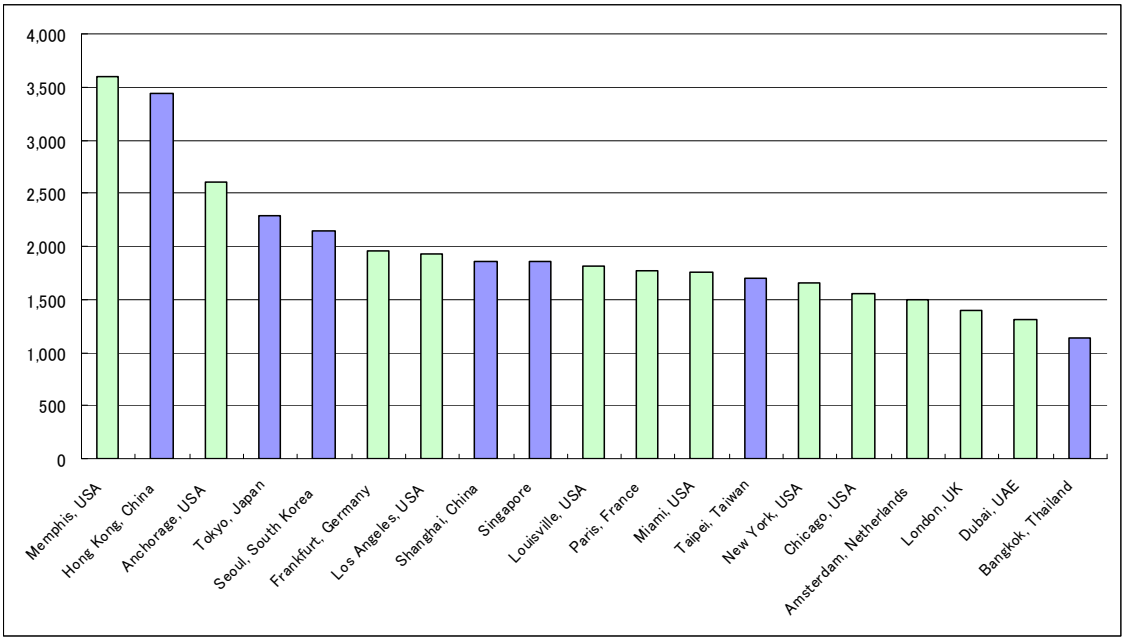
Source: American Association of Port Authorities

We also find the dispersion among the agglomeration. The port of Tanjun Pelapas in Johor takes over some portion of Singapore's freight handling. Hong Kong and Shenzhen ports look for a way to differentiate together.

Cargo volume in airports in East Asia is also of increasing importance. In 2005, six airports are in the top ten cargo handling airports in the world (Figure 2). We find Hong Kong, Shanghai and Singapore are also important hub in cargo transport.

Industrial firms have been pursuing the optimal location choice of their factories, given their circumstances including transport costs and time. However, in East Asia, there are great differences in time to export and import (Figure 3 and Figure 4)[2]. We found there are great differences in documentation time.

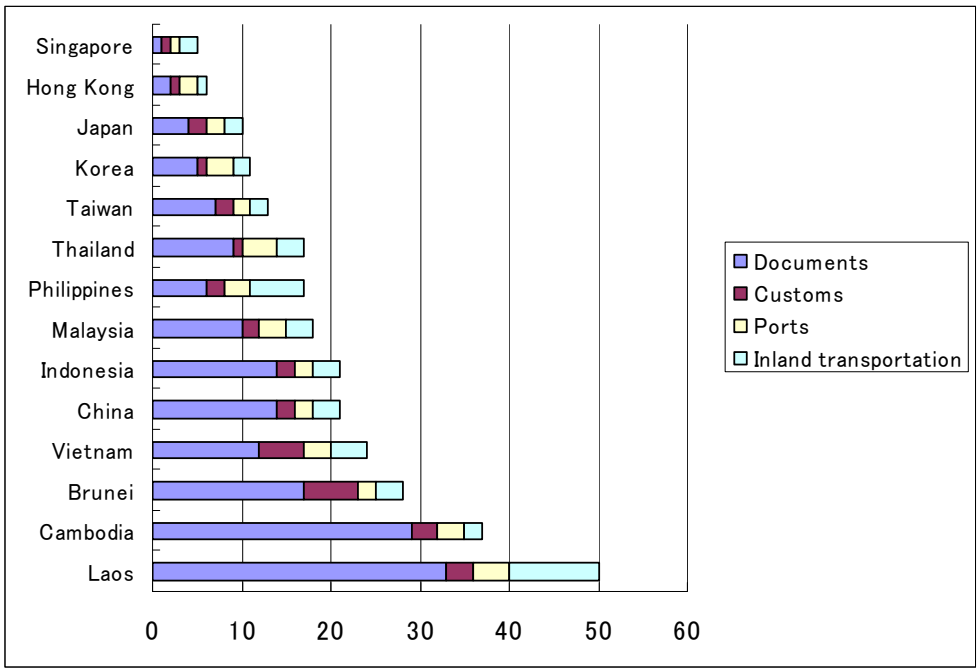
Figure 2: Airports by cargo volume (Metric Tonnes, 2005)



Source: Airports Council International

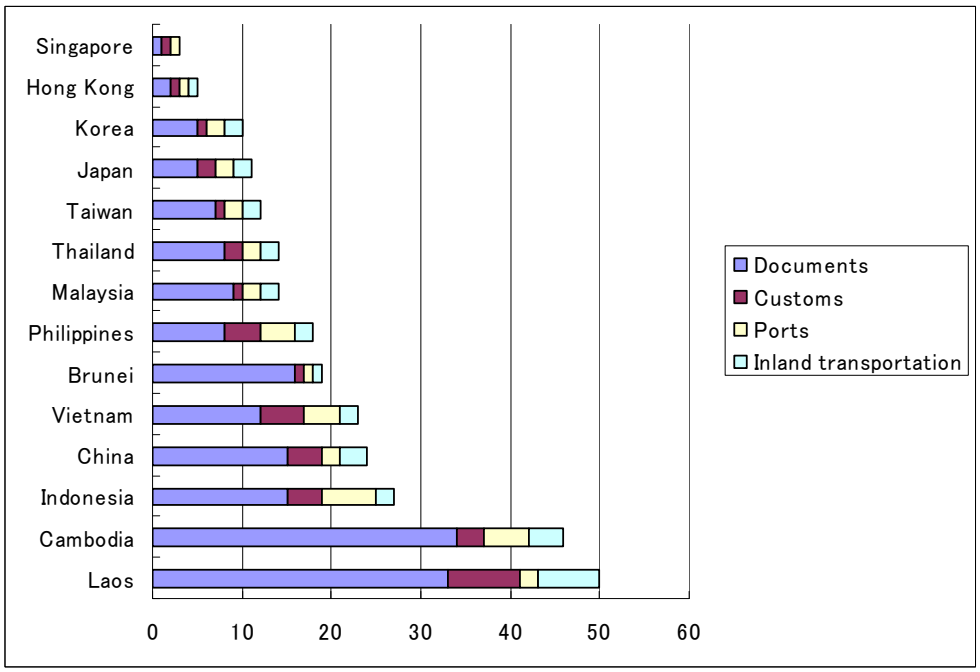
[2] It compiled all requirements for exporting and importing a standardized cargo of goods by ocean transport, including all documents required. For exporting goods, it includes procedures from packing the goods at the factory in the country's most populous city to departure from the port. For importing goods, it includes procedures from the arrival of ship at the port to the delivery at the factory warehouse.

Figure 3: Time to export (days)



Source: www.doingbusiness.org (accessed on December 3, 2007)

Figure 4: Time to import (days)



Source: same as Figure 3 (accessed on December 3, 2007)

3. FACTORS INFLUENCING TRANSPORT COSTS

The standard models of new economic geography consider the world of decreasing transport costs. However, transport costs paid by manufacturing firms are decided by logistics firms or through negotiation between manufacturing firms and logistics firms. The prices for freight transport services vary according to several factors and the situation at the time. Considering those factors, manufacturing firms and logistics firms pursue cost-reduction, quick delivery, and minimization of stock-out risk.

In general, distance is the basic factor of the transport costs. Transport costs increase as long distance. The level of transport costs depend on if there are appropriate routes, ports, or airports. In freight transport, if there is no direct shipment services, reshipments in the hub ports are needed.

Tolls and fees are also one of the basic factors. Manufacturing firms pay service fees to logistics firms. Logistics firms also pay service fees to expressway operators, air carriers, terminal operators, and maritime companies. They also bear fuel costs, labor costs, maintenance costs for tracks, etc.

Time cost itself is one of the transport costs. Delivery time is crucial for the firms. Quality and capacity of infrastructure and congestion will be considered. Firms also think procedure time, including not only in shipment, but also documentation before actual shipment. For instance, current FTAs require certificate of origin. If firms need to change purchasing source in a short time, the time to get new certificate origin will burden firms. We can think language or other cultural costs are sort of time costs.

Volume and frequency may change transport costs. Due to the existence of scale economy, larger volume decreases unit transport costs. For example, large cargo ships are designed to reach maximum size to transit Suez Canal (Suezmax), or Panama Canal (Panamax). Hub ports and container terminal around ports also reduce transport costs. Establishing industrial estates is useful to pursue scale economy on electricity, water supply, gas, and high quality roads. Industrial estates are also useful to logistics firms. High-frequency service of shipment will decrease transport costs. It makes reducing inventory costs and just-in-time operations.

Reliability and alternatives are significant for logistics services. Time accuracy is rapidly gaining significance. If a track runs low-quality roads, it diminishes speed,

makes delivery time uncertain, and may damage the goods. All Indonesian airlines including Garuda Indonesia Airline are banned from flying to EU airports in 2008 because it was thought they have safety concerns. The existence of alternatives improves reliability. It is expected Bangkok-Hanoi route using East-West Economic Corridor will be an alternative to the maritime transport, because it takes only for days to transit through Bangkok-Hanoi route while it takes two weeks for the maritime transport.

Factors influencing changes in transportation cost have been changed by policies, logistics firms, and manufacturing firms. We now outline the factors and influences in East Asia.

The development of infrastructure is one of the key policies to change transport costs. The second Mekong Bridge linked Savannakhet and Mukdahan was opened on 20 December 2006. There are the plans to establish the first Special Economic Zone in Laos at Savannakhet. In 2006 Savannakhet got FDI approvals more than sum of its FDI approvals from 1992 to 2005.

Lowering tariffs by FTAs is a sort of decreasing transport costs. Other facilitations to harmonize procedures like AHTN (ASEAN Harmonized Tariff Nomenclature) will also reduce transport costs. In 2007, there was an issue of indirect shipping. For Japan-Malaysia EPA, a Japanese company claimed it cannot utilize Japan-Malaysia EPA when it ships goods through Singapore while there is the provision for indirect shipping in Japan-Malaysia EPA.

We can find other national and international facilitations. In GMS program, there are several Cross-Border Transport Agreement (CBTA) are tested and implemented. In the first phase, they select seven borders at Mukdahan–Savannakhet, Lao Bao–Dansavanh, Aranyaprathet–Poipet, Bavet–Moc Bai, Hekou–Lao Cai, Myawaddy–Mae Sot and Mae Sai–Tachilek. Japanese Government designated the major ports in Japan to the super core ports to enhance their port operations and catch up with the trend of international hub ports.

The logistics firms also had important roles. They have been handling international intermodal freight transports, improving their operation and seeking new markets and opportunities to make profits. They have pursued scale economy to reduce cost, whereas they also have pursued Less-Than-Truckload (LCL) shipping and Less-Than-Container Load (LCL) to meet their customers' needs.

International intermodal transport includes quite a lot of services. International

logistics firms enjoy cooperation with several local logistics firms. They carry out for make it through all the entry procedures by using customs brokers. They sometimes change invisible under-the-table payments to a visible handling charge. The operation companies of some industrial estates have the affiliate logistics firms within the estates. When the firm expects it takes a time to process the documents, they bring forward the documentation before they actually transport the goods.

Logistics firms have been also minimizing inventory costs by using ICT and VMI. They must be able to do what other logistics firms are able to do.

Location choice by manufacturing firms may affect transport costs. In automobile industry, many auto-parts factories are located near the final assemblers' factories. For example, Japanese auto assemblers and auto-parts makers made their products not only in Japan, but also in foreign countries. They have been pursuing local productions in foreign countries and international specialization of products. Japanese auto assemblers purchase most body parts from local suppliers. If parts are highly differentiated or need high technologies or have large scale economy, firms will concentrate production process in one country. It may increase transport costs. If parts are less differentiated or needs high level of coordination, firms will locate their factories near the final assemblers' factories. It may decrease transport costs.

Manufacturing firms can adjust shipping time. If there are regular freight services and the firms' products are not so time-conscious, they can shift the shipping time when freight fees are not expensive. It is because there are fluctuations in freight fees according to the demands.

4. QUASI-LINEAR UTILITY MODEL WITH LOGISTICS FIRM

We consider a model based on Ottaviano *et al.* (2002). We examine the relationship among physical condition of infrastructure, logistics firms, and industrial firms.

4-1. The model

There are two regions. There are two factors denoted by A and L. A is the spatially agricultural sector, while L is the manufacturing sector. There are $\eta_1 A$ of farmers and $\lambda_1 L$ manufacturing workers in Region 1 and $\eta_2 A = (1-\eta_1)A$ farmers and $\lambda_2 L = (1-\lambda_1)L$ manufacturing workers in Region 2, where $\eta_1 \in [0, 1]$ and $\lambda_1 \in [0, 1]$.

Denote the share of manufacturing workers in all workers by μ and normalize $A+L=1$.

Technologies in agriculture sector require one unit of *A* in order to produce one unit of the homogeneous good. We assume that these homogeneous goods are shipped costlessly. The price of homogeneous goods is identical across regions. We think it as the numeraire.

Manufacturing goods are horizontally differentiated and are produced in the manufacturing sector using factor *L* as the only input under increasing returns to scale. Technology in manufacturing is such that producing *q* units requires *l* units of *L* given by

$$l = F + cq$$

where F and c are the fixed and marginal input respectively. We assume that there is a continuum of firms so that we can consider the impact of each firm on the market outcome is negligible. There is increasing return to scale in production, and each firm produces a variety of differentiated goods. The total number of firms in the total is given by $n = L/l$. The number of firms in Region 1 will be $\lambda_1 n$, and in Region 2 will be $(1-\lambda_1)n$.

There are the consumers in two regions. The labors as factor *L* and *A* are also consumers. We assume the utility function of consumers in region $r \in \{1,\ 2\}$ as

$$U_r = \alpha \int_0^{n_r} q(i)di - \frac{\beta-\gamma}{2}\int_0^{n_r}[q(i)]^2 di - \frac{\gamma}{2}\left[\int_0^{n_r} q(i)di\right]^2 + q_A \qquad (1)$$

where n_r is the number of varieties the consumers can consume, $q(i)$ is the quantity of the variety *i* each consumer consumes, and $\alpha > 0$, $\beta-\gamma > 0$. Each consumer maximize his/her utility with endowment of $\bar{q}_A$ units of numeraire and the budget constraint as

$$\int_0^{n_r} p(i)q(i)di + q_A = w + \bar{q}_A$$

where $p(i)$ is the price for variety i and w is wage by labor. The wage for factor L is w_r and for factor A is $w_A = 1$

The first conditions are

$$\alpha - (\beta - \gamma)q(i) - \gamma \int_0^{n_r} q(j)dj + q_A = p(i)$$

which leads to the linear demand

$$q(i) = \frac{\sigma(\sigma n + \sigma \int_0^{n_r} p(j)dj)}{\gamma n(n + \sigma n_r)} - \frac{\sigma}{\gamma n} p(i)$$

where $\sigma \equiv \gamma n/(\beta - \gamma)$. Substituting the linear demand and the budget constraint into (1), we can get the indirect utility as

$$V_r = \frac{\alpha^2 \sigma n_r}{2\gamma(n + \sigma n_r)} - \frac{\alpha\sigma \int_0^{n_r} p(j)dj}{\gamma(n + \sigma n_r)} + \frac{\sigma \int_0^{n_r} [p(j)]^2 dj}{2\gamma n} - \frac{\sigma^2 \left[\int_0^{n_r} p(j)dj\right]^2}{2\gamma n(n + \sigma n_r)} + w_r + \bar{q}_A$$

.

We consider manufacturing firms. Each variety can be traded at a positive cost of t units of the numeraire for each unit transported from one region to the other, regardless of the variety. We consider t as transport costs paid by manufacturing firms to the logistics firm.

We assume firms can set delivered price to each region and incur the transport costs. Each firm in region r maximizes the profit as

$$\max_{p_{r1}, p_{r2}} \pi_r = \sum_{s=1}^{2} (p_{rs} - t_{rs}) q_{rs}(p_{rs})(\mu\lambda_s + (1-\mu)\eta_s) - w_r l$$

where $t_{rr} = 0$ and p_{rs} is the price in region s set by the region r's firm, q_{rs} is demand in region s for the firm in region r. If a product is too expensive, the demand for the good may reach zero because we use linear demand function. The wage will be

decided from the zero-profit conditions.

4-2. Autarky and the start of trade

When transport costs are very high, there is no trade between two regions in *L* sector. We call the state as the autarky state when there is no trade in L sector, and the state as the trade state when there is trade between regions.

In autarky state, firms are involved in price competition within a region. When $\eta_1 = 1/2$, the price equilibrium in trade state is

$$p_{11} = \frac{\sigma t(1-\lambda_1) + 2\alpha}{2\sigma + 4}$$
$$p_{22} = \frac{\sigma t\lambda_1 + 2\alpha}{2\sigma + 4}$$
$$p_{12} = p_{22} + \frac{t}{2}$$
$$p_{21} = p_{11} + \frac{t}{2}$$

and typical price equilibrium in autarky state is

$$p_{11} = \frac{\alpha}{2 + \sigma\lambda_1}$$
$$p_{22} = \frac{\alpha}{2 + \sigma(1-\lambda_1)}$$
$$p_{12} = 2p_{22}$$
$$p_{21} = 2p_{11}$$

We now consider equilibrium of spatial distribution. We call the distribution λ_1 is a spatial equilibrium where

$$\Delta V(\lambda_1) \equiv \lambda_1(1-\lambda_1)[V_1(\lambda_1) - V_2(\lambda_1)] = 0.$$

When the transport cost t steadily decrease, trade opens up. The thresholds of transport costs at which point trade opens up are given by

$t = t_{trade}$.

We introduce logistics firm in this model in a simple way. We assume single logistics firm with scale economy. The firm will take average cost pricing to prevent entry of another firm. The profit function of the logistics firm is

$$\pi_t = t_{12}\lambda_1 n q_{12}(p_{12})(\mu\lambda_2 + (1-\mu)\eta_2) + t_{21}\lambda_2 n q_{21}(p_{21})(\mu\lambda_1 + (1-\mu)\eta_1) - 2\tau\left(\max\left\{\lambda_1 n q_{12}(p_{12})(\mu\lambda_2 + (1-\mu)\eta_2),\ t_{21}\lambda_2 n q_{21}(p_{21})(\mu\lambda_1 + (1-\mu)\eta_1)\right\}\right) - F_t$$

where τ is actual transport cost the logistics firm incur to carry one unit of freight from one region to the other region, and the firm charge t_{12} and t_{21} for one unit of freight from one region to the other region to the manufacturing firms. It sets price of services to cover its fixed cost F_t. The manufacturing firms in region 1 incur t_{12}, firms in region 2 incur t_{21} to trade their goods to the other region.

We consider the issues of back-hauling. The logistics firm has to use numeraire according to maximum of trade volume (quantity) from one region to the other region. If the trade volumes from one region to the other region are both 10 units, a track of the logistics firm goes and returns 10 times and then the logistics firm has to use $(10+10)\tau$ units of numeraire. If the trade volumes from Region 1 to Region 2 is 20 units and that from Region 2 to Region 1 is zero, a track goes and returns 20 times and then the logistics firm has to use $(20+20)\tau$ units of numeraire.

4-3. A numerical simulation

We now examine the relationship between logistics firm and manufacturing firms in the two regions using a numerical simulation. We focus on an economy where one market is larger than the other market. There are differences in demand, the number of firms, and the level of price competition.

In this simulation, we assume labors and firms don't move across regions. We start with an autarky state in which the revenue from each market is the same and the wage each manufacturing labor gets is also the same across regions. We examine which region will be advantageous when trade opens up, by comparing the revenues of manufacturing firms in the two regions. We set parameters as follows.

$$\mu = \frac{1}{10},\ \lambda_1 = \eta_1 = 4/5,\ \sigma = 5,\ \gamma = 1,\ \alpha = 3,\ n = 20,\ F_t = 0.02$$

In this case, Region 1 has a larger market than Region 2. The number of labors in manufacturing sector and the number of labors in agricultural sector in Region 1 are four times as many as Region 2. The number of firms in Region 1 is also four times as many as Region 2 because the number of firms is proportional to the number of labors in manufacturing sector.

Using these parameters, the revenues of firms from sales of their domestic market become the same across regions in autarky state. It is because firms in Region 1 enjoy larger potential demand where there are more firms and they have to set lower prices than the firms in Region 2. The wage each manufacturing labor gets is also the same across regions in autarky state[3].

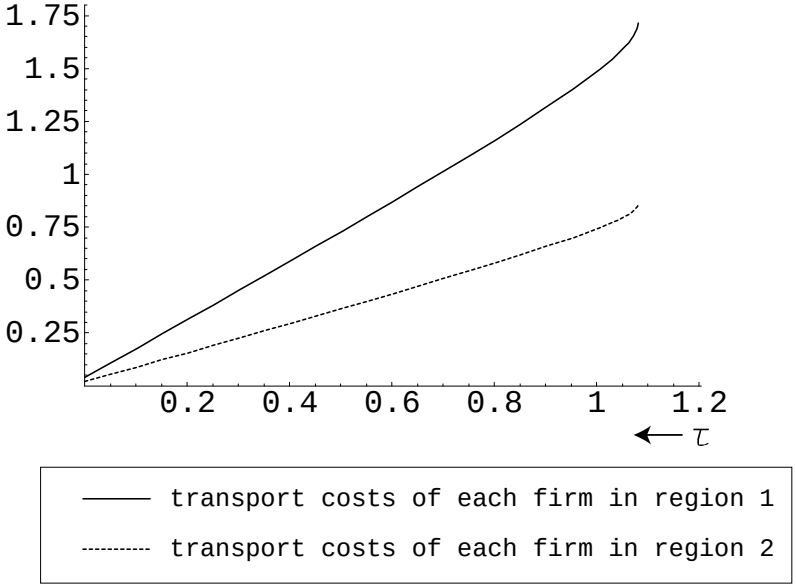
When τ becomes τ_{trade} (about 1.08), trade opens up. We can find the logistics firm has a function to mitigate trade imbalance. In this case, the logistics firm sets higher transport fees for firms in Region 1 (Figure 5). It is because the logistics firm wants to adjust logistics demand to the same level. Because there are many firms in Region 1 and they can set relatively higher prices in Region 2, the demand for trade from Region 1 is higher than from Region 2. The transport fees gradually decrease as the actual transport cost τ decreases.

The firms in Region 2 will pay transport fees lower than the actual transport cost τ for some time after trade opens up. If logistics firm cannot set different fees for the two regions, the time when trade opens up will be delayed. We can find the logistics firm has a function to accelerate trade opening.

The total trade volume (quantity) from region 1 to region 2 and that from region 2 to region 1 become the same level (Figure 6). The total trade volume gradually increases as the actual transport cost τ decreases.

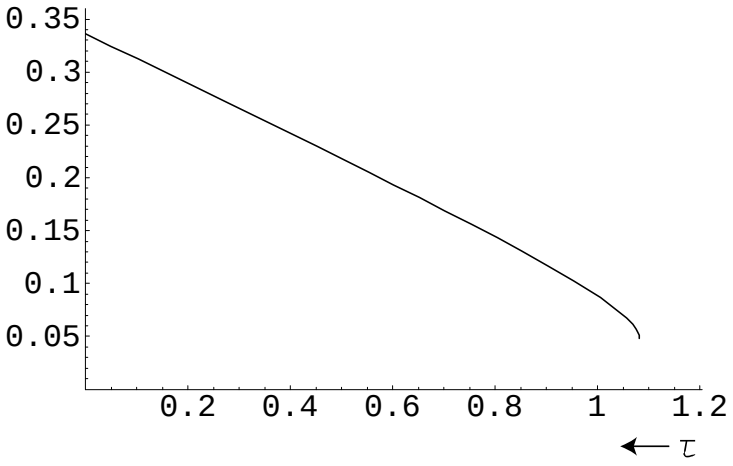
[3] The indirect utilities of labors may vary across regions.

Figure 5: Transport fees for each manufacturing firm



Source: The author

Figure 6: Total trade volume (quantity) from one region to the other region

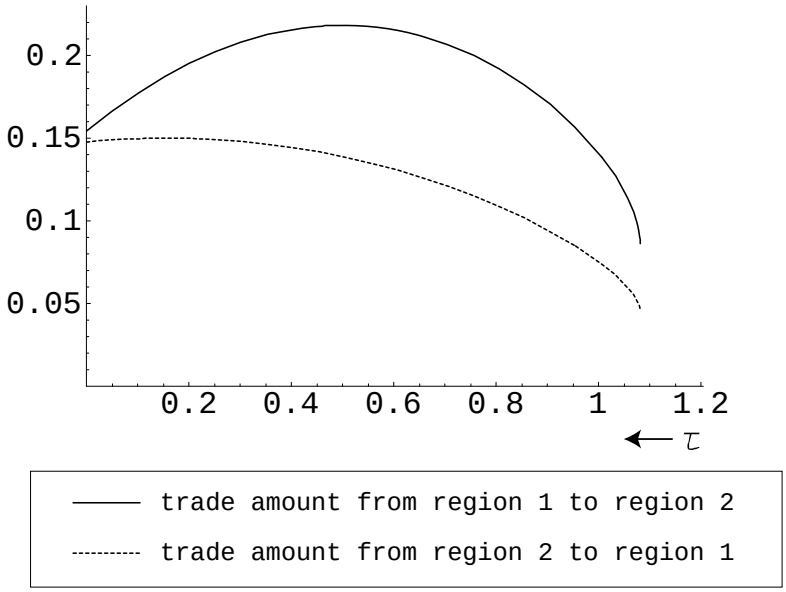


Source: The author

The total trade values from one region to the other region will vary where the total trade quantities are the same. It is because there is difference in prices between from Region 1 to Region 2 and from Region 2 to Region 1 (Figure 7). Price of the Region 1's goods in the Region 2 is higher than Region2's goods in the Region 1 because the level of the price competition in Region 2 is not as severe as that in region 1. The total trade amount from Region 2 to Region 1 gradually increases as the actual transport cost τ decreases, where the total trade amount from Region 1 to Region 2 increases gradually

when τ is in the middle level and decreases when τ is sufficiently low. It is because lowering price in Region 2 cancels out increasing trade volume as τ becomes sufficiently low.

Figure 7: Total trade amount from one region to the other region



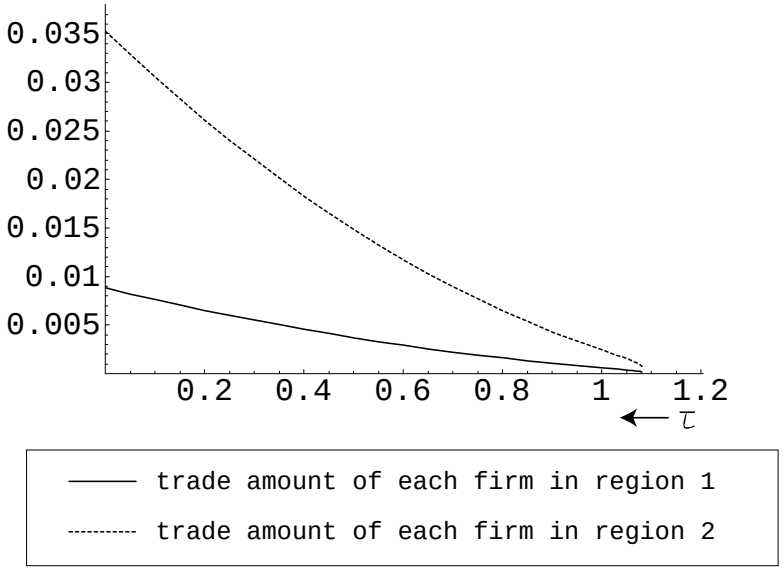
Source: The author

As for each firm, firms in the Region 2 will trade more amount than firms in Region 1 (Figure 8). The manufacturing firms in Region 1 have to pay higher transport cost to the logistics firms and the market of Region 2 is smaller than that of Region 1. Firms in Region 2 get the large market by trade where firms in Region 1 get the small market.

Charges paid revenue from domestic sales and foreign sales in Region 2 is lower than Region 1 (Figure 9). The revenues of firms in both regions drop when the trade opens up due to price competition[4]. The revenue for each firm in Region 1 gradually decreases as the actual transport cost τ decreases. It is because severe price competition in Region 1 lowers domestic sales amount for firms in Region 2. The revenue for each firm in Region 2 decreases gradually when τ is in the middle level and increases when τ becomes sufficiently low. The price competition in Region 2 also becomes severe while sales in Region 1 cancels out decreasing revenue from the domestic market.

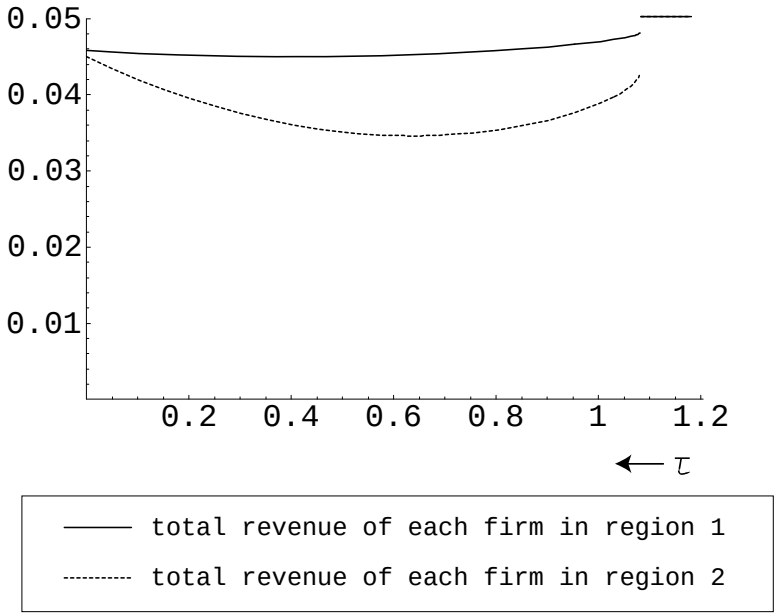
[4] Ago *et al.* (2006) discussed trade opening accelerate the price competition like Brander and Krugman (1983) and Thisse and Vives (1988).

Figure 8: Charges paid revenue for each firm from trade to the other region



Source: The author

Figure 9: Charges paid revenue for each manufacturing firm from domestic sales and foreign sales



Source: The author

5. CONCLUSIONS

From the model and simulation, we found logistics firms may mitigate the imbalance of demand in the two regions. If logistics firms can set different fees for firms in different regions, it set higher fees for the firms in the large market and lower fees for the firms in the small market.

The firms in small market will benefit from these different fees. Each firm in the small market will trade more when transport technologies are enhanced or infrastructures are developed. However, in this simulation, trade damages the small market than the large market. The key factor is the decreasing price in the domestic market. Domestic market in the small market is vulnerable to damage from price competition with the foreign goods. In this point, Free Trade Zone (FTZ) or Export Processing Zone (EPZ) is beneficial for the countries which have small markets if they have advantage in lower wages or better accessibilities.

The model needs to be improved. Potential extension will be introducing intermediate products and Export Processing Zone. If the government in the small country has advantage in lower wages or better accessibilities, it may preferentially allocate resources to lowering transport costs for the Export Processing Zone.

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