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Special Post Office, Privatization and Universal Service Obligation Costs

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Abstract

By using the empirical method, this paper analyzes Japan's "special" post office and evaluates universal service obligation (USO) costs. With empirical analysis, we obtained the following results. First, the cost of the special post office is about 9.8% higher than that of the "ordinal" post office. Second, USO costs are about 348 billion yen, accounting for 17.3% of total revenues generated by ordinal postal services. Also, approximately 81% of total prefectures are creating deficits. Third, if the special post office were abolished, USO costs would be reduced to 273 billion yen. Last, even with the privatization of the Japan Post, USO costs are still large at 251 billion yen. These results imply that reorganization of the post office network will be necessary.

1. Introduction

In October 2007, following several years of confusion, Japan Post, a public corporation created in 2003, will be privatized. Even before he assumed the premiership in 2001, Prime Minister Koizumi began pushing for the privatization of the Japanese Post Office, asserting that postal services could be provided more effectively by the private sector than by the existing public corporation. In 2005, amid strong objections from within his own Liberal Democratic Party, Koizumi proposed privatization laws regarding the Japan Post. When his proposals were rejected by the Diet, Koizumi dissolved the House of Representatives and turned to voters to test the level of support for his privatization plan. While those in government had rejected his privatization initiative, the result of the referendum was a show of clear voter support for postal reform.

There were several objections to the privatization of the Japan Post, including the concern

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that if Japan Post were privatized, the universal service provided by the post office would not be maintained, especially that postal services would be eliminated in rural areas. Postmasters of special post offices were most vocal in their objections to privatization.

This paper focuses on the special post office and universal service obligation. Within Japan Post, there have been two different organizations, the ordinal post office and the special post office. The ordinal post office is directly owned by the public agency but the special post office might be loosely defined as a "franchisee" of the Japan Post. The origins of the special post office can be traced to 1871, when the post office system began as a result of the help of local influential people. From the beginning, the behavior of the special post office seems different from that of the ordinal public sector. In our previous study, Mizutani and Uranishi (2003), we found that the introduction of competition did not improve efficiency in the public agency (the Post Office), although much research claims that a competitive environment is important (see for example, Yarrow (1986), Kay and Thompson (1986), Bishop and Kay (1989), Vickers and Yarrow (1991)). The lack of improvement in efficiency in the public agency shown in our results might be caused by the existence of the special post office. This study will investigate the following points. First, is the cost of the special post office really the same as that of the ordinal post office? Second, many people objected to the privatization of the Japan Post on the grounds that privatization would weaken or destroy the universal service obligation. How big must universal service obligation costs be in order to maintain current service prices? Third, by how much will universal service obligation costs be reduced if the special post office is abolished? If we assume that the privatization of the Japan Post will produce the same results as the privatization of the Japan National Railway, how much will universal service obligation cost?

The structure of this paper is as follows. First, we explain the postal system and the special post office. In this section, the origin of the special post office and managerial characteristics of the special post office are discussed. Second, as background information, we explain the privatization scheme of the Japan Post which was recently passed in the Diet. Third, in order to assess the cost difference between the special post office and the ordinal post office, the variable cost functions of the postal services are estimated. In this section, we estimate two different cost functions for different functional types of post office--the collection and delivery (C&D) type of post office and the non-collection and delivery (non-C&D) type of post office. Fourth, universal service obligation costs are estimated. In this section, we estimate three cases of universal service obligation costs: (i) the current situation, (ii) the abolishment of the special post office, (iii) post-privatization with the abolishment of the special post office. Finally, we present our results and overall conclusions.

2. The Postal System and the Special Post Office

2.1 Service Range of the Japan Post and the Current Mail Situation

The Japan Post, which became a public corporation on April 1, 2003, provides three main services: (1) ordinal postal services such as letters and parcels; (2) postal savings; and (3) postal life insurance. Each of these three activities is a self-supporting system, which means that the operating costs of each are covered by its user fees, etc., without financial support from the General Account. Although the postal savings and postal life insurance sectors make profits, ordinal post services created deficits in 2002. For example, in 2002, ordinal postal service costs for providing letter and parcel delivery were 2,189.8 billion yen, while ordinal postal revenues collected from the sale of stamps and postcards were 2,167.3 billion yen, producing a deficit of 22.5 billion yen.

Ordinal postal services can be classified into various types, including delivery of individual letters and post cards, delivery of periodicals such as newspapers and magazines, and delivery of non-commercial printed material such as academic prints. Table 1 shows the major classification of mail items.

Table 1. Trend in Mail Volume

Fiscal Year	Mail Service (billion items)	Parcel Delivery Service (million items)			International Mail Service (million items)	
		Post Office	Private Carrier	Share of Post Office	Outgoing mail	Incoming mail
1993	24.5	150	1,245	10.8%	129	217
1994	24.0	143	1,328	9.7%	124	241
1995	24.8	148	1,434	9.4%	123	281
1996	25.5	161	1,530	9.5%	128	301
1997	25.8	163	1,617	9.2%	131	309
1998	25.9	155	1,833	7.8%	119	279
1999	26.1	154	2,357	6.1%	113	292
2000	26.9	155	2,574	5.7%	106	298
2001	26.7	162	2,654	5.8%	99	287
2002	26.2	166	2,751	5.7%	91	269
‘02/’93	1.07	1.11	2.21	0.53	0.71	1.24

Source: Japan Post (2003, p.66)

Japan Post deals mainly with ordinal mail such as letters and cards, items which have diminished in number after a peak in 2001. Private carriers have also begun to enter this market since deregulation, making it difficult for Japan Post to monopolize the market. More serious competition is threatening Japan Post in the parcel delivery market. Since the entry into the market of Yamato parcel delivery service in 1976, the parcel delivery market has been dominated by this hugely successful private carrier. Japan Post is losing share in the international delivery market as well. The imbalance between incoming and outgoing mail pushes the cost structure upward.

2.2 Kinds of Post Offices

Post offices in the Japanese postal system can be classified into three kinds by management form and two kinds by functional form. First, as for management form, there are ordinal post offices, special post offices and summary post offices. The ordinal post office is directly owned and operated by the Japan Post Public Corporation. Its buildings and facilities are owned by the Japan Post Public Corporation, and its employees are public employees. The special post office, in contrast to the ordinal post office, could be considered a kind of franchisee of the Japan Post Public Corporation, with its buildings generally owned by the postmaster of the post office or some other private citizen and rented by the Japan Post Public Corporation for the purpose of providing postal services. Although the postmaster of the special post office is a public employee, it is customary for the postmaster's offspring to inherit his job when he retires. A more detailed description of the special post office will be presented in the next section. Last, the summary post office is one which has been contracted out to the private sector. The Japan Post Public Corporation engages a contractor who operates the summary post office in a rented part of an office building, for example.

As for the functional form of the post office, there are two kinds of post offices: the collection and delivery post office (the C&D post office) and the non-collection and delivery post office (the non-C&D post office). Figure 1 shows the system of post services in Japan. The C&D post office's role is the collection and delivery of letters and parcels to users and regional centers in the system. On the other hand, the non-C&D post office only accepts letters and parcels.

Thus, the C&D post office can be characterized as a distribution center of postal items while the non-C&D post office resembles a retail shop serving residential areas by providing postal services.

Table 2 summarizes trends related to each kind of post office since 1998. First, most ordinal post offices are C&D type post offices. In 2002, of 1,310 ordinal post offices, the C&D type accounted for 96%. Second, special post offices comprise two types, the majority being non-C&D but with about 19% being the C&D type. Another feature of the Japanese postal situation is that there are an extremely large number of post offices. In 2002, there were 24,752

post offices, making post offices the most numerous type of public facility in the nation. According to Japan Post (2003), there is on average a post office at every 1.10 km interval, while other public facilities are not as numerous (e.g. elementary schools (1.1km), police station (1.4km), national and public hospitals (4.0km), fire stations (2.3km). Another puzzling feature of the postal system in Japan is that the number of the summary post offices, which operate at lower cost, has decreased while the number of more expensive C&D type post offices has increased

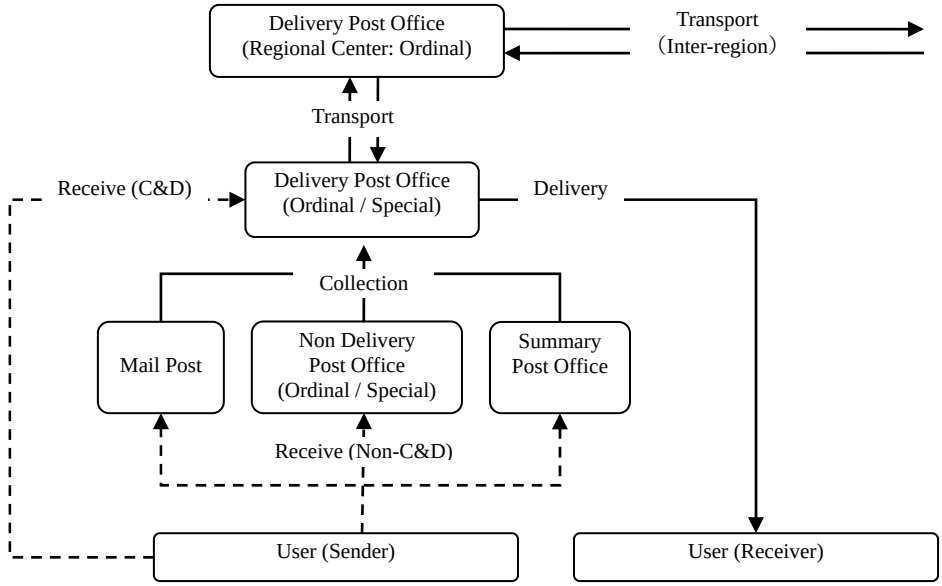

Figure 1. The System of Post Service in Japan

Table 2. Kinds of Post Office and Numbers of Post Office

Kind of Management Form	Ordinal Post Office		Special Post Office		Summary Post Office
Kind of Functional Form	C&D Post Office	Non-C&D Post Office	C&D Post Office	Non-C&D Post Office	
1998	1,257	54	3,656	15,176	4,589
1999	1,256	51	3,651	15,227	4,579
2000	1,257	51	3,641	15,275	4,550
2001	1,257	51	3,627	15,307	4,531
2002	1,260	50	3,563	15,378	4,501
‘02/’98	1.00	0.93	0.97	1.01	0.98

Note: C&D Post Office (Collection and Delivery Post Office), Non-C&D Post Office (Non-Collection and Delivery Post Office)
Source: Japan Post (2003, p.36)

2.3 Origin of the Special Post Office

The modern Japanese postal service system began in 1871, after its founder, Hisoka Maejima, visited the UK and observed the postal system there. However, because of the budget constraints of the National Government, it was difficult to establish a modern post office network in a short period. The government called on regional influential people to cooperate by lending their land, for example, or parts of their estates to be used as post offices, in return appointing these landowners postmasters. Many regional influential people cooperated with the government out of the patriotic conviction that a postal service system was necessary in order to create a modern Japanese society. Through the efforts and cooperation of its founders and supporters, a nationwide postal service network was completed in about three years (Tanaka, 2004). By 1872, 21 post offices had been established by the government, but the number of post offices established by the private sector was an astonishing 1,138 (Ministry of Posts and Telecommunications, 1971 and 1991). Thus, the privately established post offices were dominant from the very earliest days of the post network in Japan. These private post offices established by regionally influential people were the first of what are now called “special” post offices.

After going through many changes, post offices began to be classified into three types. The third class of post office categorized in 1886 became what is now the special post office. In 1941, the classification of the three types was revised, and post offices were reorganized into two classes. The first and the second class became ordinal post offices and the third class became the special post office.

2.4 Characteristics of the Special Post Office

Surely, the special post office has played an important role in the establishment of the modern Japanese postal system. In the early days of the postal system, there were many cases in which postmasters went so far as to donate their private assets to the public. Since then, the special post office has displayed several unusual characteristics that distinguish it from other organizations in the general public sector. In this section, we will describe the characteristics regarding three important issues: (i) appointment of the postmaster, (ii) building and facilities, and (iii) management system.

Appointment of the Postmaster of the Special Post Office

Postmasters of special post offices are appointed in a different way from postmasters of ordinal post offices. Although both are government officials, the postmaster of an ordinal post office is "a general postal administration official," in other words a national civil servant appointed postmaster in the course of an official government career. On the other hand, although the

postmaster of a special post office is a government official, he is appointed from outside the ranks of general career government officials. Whereas nowadays vacant positions for postmaster of a special post office are theoretically open to the public, there has customarily existed, and in practice there still exists to some extent, a closed system whereby vacancy information is not made public, and it often remains obscure how postmasters at special post offices are replaced. While there are cases nowadays in which an unrelated person is appointed as postmaster of a special post office, especially in large cities, the appointment system still lacks transparency and most postmasters continue to be those who have inherited the job from their parents. This system has been criticized by many who consider it unfair, unprofessional, and feudalistic.

Postmasters of special post offices have several advantages over postmasters of ordinal post offices. For example, retirement age is 65 for special post office postmasters but 60 for general post office officials (Segawa, 2005). Furthermore, a special post office requires at least 8.9 million yen only for the salary of the postmaster but at a summary post office of the same size, only 4.2 million yen is needed for all expenses (Segawa, 2005).

Buildings and Facilities of the Special Post Office

The second characteristic of the special post office is that, while all buildings housing ordinal post offices are owned by the Japan Post Public Corporation, even now there are many cases in which buildings housing special post offices are privately owned. Many of the special post offices in fact double as residences for the postmaster owner, and a substantial number of special post offices are located in heritable property.

For example, there were 18,942 special post offices by the end of March, 2003. Of these special post offices, only 1,436, or 7.6%, were owned by Japan Post. On the other hand, the number of special post offices in which the buildings are rented by Japan Post from private owners is 17,506, or 92.4%. Of these 17,506 post offices, cases in which buildings are owned by the postmaster himself number 5,788, or 33.1% (Harada, 2004). Presumably, the percentage of post offices with postmaster ownership is higher in the countryside. Because the private owners of the buildings of the special post office can expect stable rental revenues from the publicly owned Japan Post, continued public ownership of the Japan Post is apparently in their best interest .

There have been complaints that rental fees paid to special post office owners may exceed the market price, and because the Post Office has not published detailed information disclosing rental cost, it is natural that there is suspicion. Quite recently, according to the Nihon Keizai Shinbun (2006), rental fees paid by the Japan Post Public Corporation were on average 4.75 million yen per special post office. If this estimate is correct, it would indicate a monthly rental fee of about 396 thousand yen, certainly in most cases considerably higher than the market price.

Management System

Human resource allocation for the special post office is decided by Japan Post. The running expenses of the post office are also determined by its size. A postmaster of a special post office cannot allocate employees or decide running expenses himself. And because the financial independence of the postal service is judged from the point of view of the entire postal system, theoretically it does not matter to Japan Post whether each individual special post office's management is efficient. An individual post office has no incentive to run efficiently, regardless of whether it is a special or an ordinal post office. Furthermore, most special post offices are small[1]. There are 13,698 special post offices with less than five employees, accounting for 72.5% of the total.

Another distinctive feature of the special post office is that there was until recently a category of expense which applied only to it. Originally intended to be used to cover the expense of lighting, fuel, or equipment, the "watashikiri-hi" (free-use allowance) was provided annually to postmasters of special post offices. There were no restrictions on the use of this money or requirements that its use be accounted for. The amount of "watashikiri-hi" was about 91.2 billion yen for the entire postal system, or an average of about one million yen per postmaster in 2000 (Tanaka, 2004). However, according to Segawa (2005), postmasters serving as regional section chiefs received much higher amounts of "watashikiri-hi." Although the post office has an audit system, categories of expenses such as "watashikiri-hi" create room for vagueness and inefficiency in the postal service. In 2003, the "watashikiri-hi" was abolished after many complaints about its lack of transparency.

3. Privatization of the Japan Post

3.1 Pros and Cons of Privatization

The law for the privatization of Japan Post was passed in October, 2005, and the organization is slated to become private in April, 2007. Before its ultimate success, however, the law requiring the privatization of Japan Post was rejected in the House of Councilors in August after having passed in the House of Representatives. To establish support for his initiative, Prime Minister Koizumi dissolved the House of Representatives and held a snap election, winning a landslide victory for the LDP and vindicating his plan for postal reform, which subsequently passed both houses without resistance.

[1] According to Tanaka (2004, p.126), at the end of March, 2003, the size distribution of the special post office is as follows: 2-person-employee (2,363 post offices, 12%), 3-person-employee (4,049 post office, 21%), 4-person-employee (4,265 post office, 23%), 5-person-employee (3,014 post office, 16%), 6-person-employee (1,143 post office, 6%), 7-person-employee (739 post office, 4%), 8-person-employee (3,36 post office, 18%).

There were several reasons put forward for the privatization of Japan Post. First, many services provided by Japan Post are already being performed by the private sector. The savings (postal savings) service offered by the post office does not significantly differ from that at private banks. Insurance (postal insurance) is also provided by private insurance companies. Even for ordinal postal services, the private sector is involved to some extent. For example, parcel delivery services are provided by private companies. Periodicals and mail documents also are delivered by private companies. The only item limited to Japan Post is personal messages.

Second, while Japan Post as a whole is not creating deficits, most post offices are creating deficits, especially in the countryside. As we mentioned before, post offices are spaced even more densely than elementary schools, with most post offices being special post offices, more expensive to maintain than the other two kinds of post offices in Japan. Privatization would mean that Japan Post would be free to reform expensive, inefficient, perhaps superfluous special post offices. Changing them into summary post offices might be an option.

Third, money the government makes through postal savings is used for investment in special corporations. For example, the government uses money from government investment and loan programs, notably the postal savings business, to construct highway networks through the agency of the Public Highway Corporation. The amount of postal savings is huge, supplying special corporations with a flood of investment money, many of it inefficiently channeled into the construction of unnecessary highways or other public works projects. This activity, often criticized as contributing to environmental degradation, has been cited as one justification for the privatization (or the elimination) of postal savings.

On the other hand, many people oppose privatization (e.g. Tanaka (2004), Takigawa (2004)). Objections have been heard from postmasters of special post office and union members of Japan Post, who offered several reasons why Japan Post should not be privatized. The biggest objection was that universal service will not be maintained. In rural areas, the post office is often the only financial institution, so that with the privatization of the Japan Post, the service level in rural areas might be reduced.

Others oppose privatization because they believe that public ownership is necessary. Services provided by the post office are not limited to only what might be called postal services. In rural areas, post offices provide some services which would be otherwise difficult to obtain, having made agreements with municipal governments to provide patrons with official documents such as resident cards and tax payment proof documents. Opponents of privatization claim that the privatized post office cannot provide such governmental services.

3.2 Privatization Scheme

The privatization scheme taken by the government has several characteristics, the first of which relates to the organizational structure of the postal services. In 2007, the Japan Post will be reorganized into one stock holding company and four postal service providing companies. The four postal providing companies are the following: the post office company which holds the post office buildings; the postal service company; the postal savings company; and the postal life insurance company. The post office company will provide postal customer services by contracting-in from the three other companies. These four companies will be owned by the Japan Post stock holding company.

Second, the privatization procedure will be carried out in two steps. The first step is creating five new private companies in 2007: one stock holding company and four postal service providing companies. The first step is considered a transition period toward full privatization. Shares of the stock holding company will be owned by the government. This transition period will last until the year 2017, when the second step of privatization will begin. During the second stage, all shares of both the postal saving company and the postal life insurance company will be sold to the private sector. Therefore, only the post office company and the postal service company will remain within the Japan Post group. At the second step, two thirds of the shares of the Japan Post stock holding company will be sold to the private sector. Therefore, the Japan Post will continue to be regulated by the government as a partially privatized company, a special corporation under Japanese law.

Third, in order to maintain regional local services, the “Social and Regional Maintenance Fund (Shakai Chiiki Koken Kikin)” will be established. This fund is expected to be about one trillion yen (about $US 8.5 billion). The main source of revenue for this fund will come from the proceeds of the sale of stock shares of the postal saving company and the postal life insurance company. The post office company and the postal service company will use the revenues from this fund in the capital market to maintain postal services in local areas.

4. Effect of the Special Post Office on Costs

4.1. Cost Model

The main purpose of this section is to evaluate whether the special post office causes the cost structure to increase. Many researchers claim that the special post office, because it has no incentive to reduce costs, has a tendency to push the post office’s cost upward. Furthermore, the special post office might have higher costs than the ordinal post office due to an easier environment for rent seeking behavior. Publicized scandals regarding the relationship between politicians and postmasters might provide insight into possible unnatural influences on cost structure. In this

section, we will evaluate whether the special post office in reality has higher cost than the ordinal post office, by estimating the cost function of the postal service. In this study, we distinguish two kinds of activity in the ordinal postal services: the collection and delivery activity (C&D) and the non collection and delivery activity (non-C&D). As we explained before, because post offices in Japan are distinguished by activity of postal services and the cost structure of these activities is different, the collection and delivery type (C&D) post office and the non-collection and delivery type (non-C&D) post office are formulated differently. Therefore, we separately specify the cost function of each post office.

First, we consider two functional types of post office, the C&D post office and the non-C&D post office. For the functional type of post office-i (i = C (the C&D post office), NC (the non-C&D post office), the cost functions for each post office consist of output (Y_i) and two input factor prices: labor, material and service (w_{Li}, w_{Mi}). Furthermore, for collection and delivery activity in rural areas, the mail volume would be smaller and that fact affects the cost structure of the C&D post offices. Therefore, we include a variable for rural ratio (R) in the cost function of the C&D post office. Finally, as the cost structure of the special post office might be different from that of the ordinal post office, we also include a variable for the ratio of special post office (S) in the cost function of the C&D post office. It is worth noting that we wished to include a summary post office in these functions but there was no data available for this type of post office, so that we were forced to exclude the summary post office. Finally, as most non-C&D post offices are special post offices, we do not include the ratio of special post offices in the cost function of the non-C&D post office[2]. As a functional form, we employ a Cobb-Douglas cost function[3]:

$$\ln VC_C = \alpha_C + \alpha_Y \ln Y_C + \beta_{LC} \ln w_{LC} + \beta_{MC} \ln w_{MC} + \gamma_R \ln R + \gamma_S \ln S \quad (1)$$

$$\ln VC_{NC} = \alpha_{NC} + \alpha_{QNC} \ln Y_{NC} + \beta_{LNC} \ln w_{LNC} + \beta_{MNC} \ln w_{KNC} \quad . \quad (2)$$

The outputs treated in the C&D type post office are classified into four categories (see Figure 1): (1) mail directly received from senders, (2) mail collected from posts, (3) mail transported to other post offices, (4) mail delivered to individuals. Of course, the ratio of these activities also affects the cost structure of the C&D post office, even if the post office has the same mail volume of output. Therefore, we specify the output measure for the C&D post office as the hedonic formula of total treated mail items (Q_C), the ratio of received mail from senders (H_R), the ratio of collected

[2] In FY2002, in the category of the non-C&D post office, the number of special post offices was 15,378. On the other hand, the number of ordinal post offices was only 50. Therefore, the special post office in this category accounts for 99.7%.

[3] As a functional form, the translog cost function is better because it has fewer restrictions than the Cobb-Douglas cost function. However, because of a problem with sample size, we use the Cobb-Douglas cost function.

mail items (H_C), and the ratio of mail delivered to individuals and transported-out (H_D) as follows:

$$\ln Y_C = \ln Q_C + \eta_R \ln H_R + \eta_C \ln H_C + \eta_D \ln H_D . \quad (3)$$

On the other hand, the non-C&D post office has customer service activity only. Therefore, we consider only the total volume of mail received from customers. And the output measure (Y_{NC}) is equal to the total volume of mail (Q_{NC}).

We estimate these two cost functions with the full information maximum likelihood (FIML) method by substituting equation-(3) into equation-(1). In these models, we impose the restriction on input factor prices such that $\Sigma_i \beta_{iC} = 1$, $\Sigma_i \beta_{iNC} = 1$ (i = L (labor), M (material)) and do so on output characteristic variables such that $\Sigma_j \eta_j = 1$ (j = R (receive), C (collection), D (delivery and transport-out)).

4.2. Data

Our main data sources are annual statistics issued by the national government, except for data related to postal service expenses, which was obtained mainly from two sources, the Regional Profit and Loss Statement of the Post Office and Statistics on Postal Services. Although the former source is not published, we obtained the data directly from the Japan Post. The latter source is annually published by the Japan Post. Data related to the definition of rural areas was obtained from the Government Reports issued by the Ministry of Internal Affairs and Communications.

The basic unit for the analysis in this study is the prefecture. We collected data for three years from 2000 to 2002. Because there are 47 prefectures in Japan, the total sample size for the analysis is 141 observations.

Although the basic unit for the analysis is the prefecture, some data such as postal expenses and input factors are not available on a prefecture-basis because these are reported on a postal administrative division-basis. Therefore, we converted some data from the postal administration division-basis to the prefecture-basis. The correspondence of the postal administration division to each prefecture is shown in Table 3.

The conversion method from the postal administration division to each prefecture is as follows. First, we allocate the postal service expenses based on the number of post offices in each prefecture, because these numbers were available. However, the costs of a post office vary by its functional type (the C&D or the non-C&D post office) and by its administrative type (the ordinal post office or the special post office). For example, according to test calculation results obtained by the Japan Post in 2005, the postal service expenses of the C&D post office are about 3 to 8 times

higher than the expenses of the non-C&D post office in each prefecture. Therefore, we consider the types of post office for the allocation of postal service expenses. In this study, based on the results of Japan Post, we converted division-based postal service expenses to prefecture-based postal expenses.

Table 3. Postal Administration Division and Prefecture

Postal Administration Division	Prefecture
Hokkaido	Hokkaido
Tohoku	Aomori, Iwate, Miyagi, Akita, Yamagata, Fukushima
Kanto	Ibaragi, Tochigi, Gunma, Saitama, Chiba, Kanagawa, Yamanashi
Tokyo	Tokyo
Shinetsu	Niigata, Nagano
Hokuriku	Toyama, Ishikawa, Fukui
Tokai	Gifu, Shizuoka, Aichi, Mie
Kinki	Shiga, Kyoto, Osaka, Hyogo, Nara, Wakayama
Chugoku	Tottori, Shimane, Okayama, Hiroshima, Yamaguchi
Shikoku	Tokushima, Kagawa, Ehime, Kochi
Kyushu	Fukuoka, Saga, Nagasaki, Kumamoto, Oita, Miyazaki, Kagoshima
Okinawa	Okinawa

Second, in order to obtain the average wage, it is necessary to know the numbers of employees of post offices in each prefecture. However, this data is not directly available so that we had to estimate the numbers of employees. It is a fact that the common expenses of the three major postal services (ordinal postal services, postal savings and postal insurance) of the Japan Post are allocated by the numbers of employees, we use common expenses as the weight for the calculation of number of employees. Therefore, we converted the total number of employees to a prefecture base, according to the percentage of the common expenses of each prefecture.

Last, we define capital costs as the total of depreciation costs, interest payments, and other capital related costs in the analysis of the universal service obligation costs. But the data which we obtained is also added up for the whole postal service. We use the numbers of the ordinal post offices in each prefecture for the allocation of capital costs. The biggest ratio in repayment assets of a postal service are the buildings of post office and those of ordinal post offices owned by the Japan Post.

4.3. Definition of Variables

The variables used for the estimation of variable cost function are defined as follows. And the statistics of these variables are shown in Table 4 and Table 5. First, the variable cost (VC_i, i = C (C&D), NC (non-C&D)) is the sum of labor costs and material and service costs. Energy costs, which would be incurred mainly for gasoline for trucks and motorcycles, are included in material and service costs.

Table 4 Statistics of Used Variables : C&D Type Post Office						
Variable			Mean	Standard Deviation	Minimum	Maximum
VC_C	Variable Cost	million yen	24,511	26,629	4,393	176,006
w_{LC}	Labor Price	million yen per employee	6.4688	1.0650	4.3147	11.4629
w_{MC}	Material Price	million yen per office	52.8050	47.3676	13.8489	264.3676
Q_C	Output	thousand piece	1,415,044	2,716,491	170,701	18,275,900
H_R	Received Ratio	-	0.2601	0.0318	0.1610	0.3809
H_C	Collection Ratio	-	0.0613	0.0228	0.0152	0.1091
H_D	Delivery Ratio	-	0.6786	0.0234	0.6039	0.7299
R	Rural Ratio	-	0.2620	0.1894	0.0001	0.7195
S	Special PO Ratio	-	0.7220	0.1979	0.0941	0.9200
S(L)	Share of Labor Cost	-	0.7863	0.0378	0.6330	0.8438
S(M)	Share of Material Cost	-	0.2137	0.0378	0.1562	0.3670

Table 5 Statistics of Used Variables : Non-C&D Type Post Office						
Variable			Mean	Standard Deviation	Minimum	Maximum
VC_{NC}	Variable Cost	million yen	2,829	2,812	677	19,066
w_{LNC}	Labor Price	million yen per employee	14.0661	1.9198	6.7440	18.2291
w_{MNC}	Material Price	million yen per office	1.4559	0.3429	0.9667	3.0762
Q_{NC}	Output	thousand pieces	34,627	47,738	6,995	294,082
S(L)	Share of Labor Cost	-	0.8235	0.0340	0.6268	0.8672
S(M)	Share of Material Cost	-	0.1765	0.0340	0.1328	0.3732

As for output measure, we use the total number of post items (Q_i). This measure consists of mail-post items and parcels received, collected, transported and delivered to recipients. While the role of non-C&D post offices is only to receive mail from customers, the C&D post offices engage in all kinds of activities related to mail--receiving, collecting, transporting and delivering. Therefore, in the cost function of the C&D post office, we define the output variable as the implicit output index (Y) instead of mail volume. As we explained before, in order to avoid estimation bias based on different kinds of output, we include four kinds of variables of output characteristics: the ratio of received mail (H_R), the ratio of collected mail items (H_C), the ratio of mail delivered to individuals and transported-out (H_D). The ratio of received mail is the ratio of the number of mail

items directly received from senders to the total number of mail items. The ratio of collected mail items is defined as the ratio of the number of collected mail items to the total number of mail items. The ratio of mail delivered to individuals and transported-out is defined as the ratio of the number of mail items delivered to individual households and transported to other regions to the total number of mail items.

We defined two kinds of input factor prices. First, labor price (w_{Li}) is defined as the average annual salary per employee. This is obtained by dividing annual labor costs by permanent employees. Material and service price (w_{Mi}) is obtained by dividing material and service expenditures by the number of post offices. As we mentioned before, energy expenditures are included in the expenditures.

Two kinds of institutional variables are defined. First, rural ratio (R) is used as a measure of universal geographical condition. The measure is defined as the ratio of rural municipalities in each prefecture. The definition of a rural municipality is based upon the rural area law. Second, the special post office ratio (S) is defined as the ratio of the number of special C&D post offices to the total number of C&D post offices. As we explained before, the office buildings of special post offices are privately owned and the headquarters of the Japan Post rent their buildings from the special post office.

As noted in the previous section, we define the capital costs of postal service. However, we do not include capital costs in this cost model because the cost functions estimated in this study are variable costs of the C&D post office and the non-C&D post office. Most items of capital costs are costs of repayment assets such as office buildings. As only ordinal post offices own their own buildings, their cost structure would be different from that of special post offices. Therefore, it is not appropriate to include capital costs and to assume the same capital price for these types of post offices.

4.4. Estimation Results of Cost Function

We estimate two kinds of cost functions shown in equation-(1) and (2) simultaneously. In addition, we substitute the output characteristic function into the cost function of the C&D post office beforehand, shown in equation-(3). The estimation method is full information maximum likelihood (FIML) for all cost functions. As for cases of estimation, we estimated three cases according to selection of institutional variables.

The estimation results for these three cases are summarized in Table 6. The goodness-of-fit in the regression is acceptably high for all models. As for the required properties in the cost function, first, homogeneity conditions in input factor prices are satisfied, because we imposed restrictions on the cost models. Second, as for monotonicity conditions, it is necessary

that the cost function is a non-monotone decreasing function in both output and input factor prices. The monotonicity conditions are evaluated by checking the partial derivative of the cost function with respect to output and input factor prices. And it is necessary that the partial derivative is not negative (i.e., $\partial \ln VC_C / \partial \ln Q_C \geq 0, \partial \ln VC_{NC} / \partial \ln Q_{NC} \geq 0, \partial \ln VC_i / \partial \ln w_i \geq 0$). In our test results, these conditions are satisfied.

Table 6. Estimation Results: Estimate and Standard Error

	Case	Case-1		Case-2		Case-3	
	Model	Model 1C		Model 2C		Model 3C	
C&D Post Office Cost Function	α_C	10.2866 (0.0393)	***	10.2501 (0.0431)	***	10.2837 (0.0401)	***
	α_Y	0.5741 (0.0391)	***	0.5384 (0.0353)	***	0.5850 (0.0317)	***
	η_R	0.2035 (0.5247)		- 0.0526 (0.5346)		0.2692 (0.4760)	
	η_C	0.3416 (0.1505)	**	0.3503 (0.1529)	**	0.3401 (0.1528)	**
	η_D	0.4549 (0.6308)		0.7023 (0.6280)		0.3907 (0.5873)	
	β_{LC}	0.8287 (0.0796)	***	0.8646 (0.0852)	***	0.8450 (0.0782)	***
	β_{MC}	0.1713 (0.0796)	**	0.1354 (0.0852)		0.1550 (0.0782)	**
	γ_R	0.0193 (0.0257)		0.0412 (0.0238)	*	-	-
	γ_S	0.2011 (0.1312)		-	-	0.2643 (0.0988)	***
	R-squared	0.8762		0.8699		0.8756	
	Sample size	141		141		141	
		Model 1NC		Model 2NC		Model 3NC	
Non-C&D Post Office Cost Function	α_{NC}	8.0216 (0.0244)	***	8.0210 (0.0238)	***	8.0221 (0.0249)	***
	α_{QNC}	0.7220 (0.0253)	***	0.7206 (0.0241)	***	0.7233 (0.0252)	***
	β_{LNC}	0.6298 (0.0431)	***	0.6252 (0.0452)	***	0.6385 (0.0429)	***
	β_{MNC}	0.3702 (0.0431)	***	0.3748 (0.0452)	***	0.3615 (0.0429)	***
	R-squared	0.8995		0.8996		0.8994	
	Sample size	141		141		141	

This table indicates some interesting results. First, the coefficients in output measure are less than one. This implies that economies of scale exist in each post office. Moreover, the coefficient of the C&D post office is less than that of the non-C&D post office. This implies that more economies of scale exist in the C&D post office than in the non-C&D post offices. These

results support the findings of previous studies such as Panzar (1993), Cazals et al. (1997) and Bradley and Colvin (1995), who assert that the main source of scale economy in postal service is derived from mail delivery.

Second, the coefficients of both the rural ratio and the special post office ratio show the positive sign. Although each of them is statistically insignificant in Case 1, the coefficients of these institutional variables are both positive and statistically significant in Case 2 and Case 3. This implies that if the Post Office has more rural areas and more special post offices, then costs go up. One important finding is that the special post office has a cost disadvantage over the ordinal post office, as many people have claimed. The special post office's cost is about 20% higher than that of the ordinal post office.

5. Estimation of the USO Cost

5.1. Definition of Universal Service

In this section, we estimate the universal service obligation (USO) cost and evaluate whether or not universal service can be maintained. USO costs are estimated here for the following reasons. First, when policy options for the reform of postal services are discussed in Japan, USO costs are recognized as important, but almost no one has shown the magnitude of USO costs for Japanese post offices. Second, we obtained information showing that the special post office has higher costs than the ordinal post office. If we abolish the special post office system, how will USO costs be affected? Third, having been passed into law, privatization is inevitable. By how much will privatization reduce USO costs? We will explore these issues.

A measurement of the USO cost is obtained by net avoidable cost (NAC) approach, as we explain later. As for the definition of the USO, in this study generally we follow the definition of Crew and Kleindorfer (1998). The USO is not defined specifically based on types of service (e.g. cards, letters, parcels) or limits of services (e.g. number of deliveries, price of services) In fact, according to our survey of previous studies, no one has clarified what kind of services or what service level should be defined as universal service. It is natural that universal service levels cannot be defined because the purpose of each country's post office itself is to provide universal service, as IPTP (2000) points out.

Crew and Kleindorfer (1998), however, define the USO as a requirement on the incumbent Post Office to provide ubiquitous service at a uniform price. Rodriguez and Storer (2000) define it as a provision of ubiquitous minimum quality services to all (national) customers at a uniform, affordable set of prices, which entails the subsidization of services to some customers. Similarly, Castro and Maddock (1997) define the USO cost as where the avoidable cost of the carriage of a letter on a given path exceeds the price charged, the net difference is the cost of the CSO for the

letter. Thus, we define the USO cost as the sum of deficits derived from the provision of the current service levels at a uniform price in a deficit-making area.

5.2. Estimation of the Universal Service Obligation Cost

There are two different approaches that have been taken to estimate the USO cost. One is the net avoidable cost (NAC) approach and the other is the entry pricing (EP) approach. The NAC approach is based on the estimated avoidable cost, which the operator is able to avoid when it does not provide service only for a deficit-making area. In this approach, the total amount of deficit in the deficit-making areas, in which the uniform price could not cover the average incremental cost of providing services, is defined as the USO costs. Originally this approach was developed in the telecommunications industry but has also been applied to the postal service industry. For example, Castro and Maddock (1997) used this method to estimate the USO cost of the Australia Post.

On the other hand, in the EP approach, the USO cost is defined as the decrease of the profit in profitable regions after competition is introduced. Universal services are maintained by cross subsidies from profitable regions to deficit-producing regions. Therefore, in this method, the USO cost is measured by profits taken over by the new entrant in the profitable region. As an example of this method, there are studies of Bradley and Colvin (2000) for the USPS of the United States and Robinson and Rodriguez (2000) for the Post Office of the United Kingdom. However, one big problem with this method concerns the difficulty of measuring the competitive environment. Surely, the results of the USO cost vary according to how the competitive environment is set up.

In this study, we use the NAC approach to measure the USO cost. As we mentioned above, the USO cost obtained by the EP approach is greatly influenced by how the competitive environment is set up. In the current Japanese postal service network, it is not easy to set up a competitive environment. For example, it is necessary to analyze the current competitive environment for delivery services such as small parcel delivery because private companies actually compete with the Post Office in this market. Furthermore, we can employ the estimation results of the cost function. For these reasons, we choose the NAC approach as the measurement method.

5.3. Estimation Procedure of the Universal Service Obligation Cost

In this section, we will explain the estimation procedure of the USO cost. As we explained before, the USO cost used here follows the definition by Castro and Maddock (1997), whereby “the avoidable cost of the carriage of a letter on a given path exceeds the price charged, the net difference is the USO cost for that letter.” In this study, instead of “path,” we take the “region.” After we classify “deficit regions” and “profitable regions” by judging whether the unit cost per piece exceeds the uniform tariff, we consider the total loss of “deficit regions” as the USO cost. As for postal services, in this study, we take all kinds of ordinary mail (e.g. letters, cards and published

items such as periodicals) and parcel goods. The USO cost of postal service is estimated in five steps, following a study by Uranishi (2004).

(1) Step 1: The definition of total cost

First, we define the total cost of each area as follows:

$$TC = \Sigma_i VC_i + \Sigma_j FC_j \quad (4)$$

The total cost of each area (TC) is calculated as the sum of variable cost (VC_i) of post type i (i = C (Collection and delivery), NC (Non-collection and delivery). These variable costs are estimated using econometric methods. As for fixed costs, there are three components, which are capital cost (FC_K), common expense parts of the three post business (FC_{CC}) and administration expenses of the regional headquarters (FC_{AD}). The administration expenses of the regional headquarters are for the purpose of management and control of the postal network. We include such costs in the total cost of each region

(2) Step 2: Obtain the calculated value of total costs

In step 2, we determine the calculated value of total costs by using the estimated cost functions shown in the previous chapter. Without using the estimated cost functions, we can obtain each area's total costs by simply using observed total costs. However, the observed total costs might include abnormal values in a specific year. Therefore, in this study, we use a calculated value of total costs. First, we obtain the calculated variable costs of each area, by substituting numbers for each area for all explanatory variables into the variable cost function. And then adding the fixed costs of each area to the calculated variable costs, we can obtain the calculated total costs. That is, that the output of mail volume, input factor prices and other institutional or geographical factors in each area are controlled to obtain the variable costs.

(3) Step 3: Obtain the average total cost and the uniform tariff of the postal service

In this step, the average total cost of the postal service of each area and the uniform tariff of the postal service are obtained. First, the average total cost of postal service of each area is obtained by dividing the total costs, shown in equation –(4), by the total output of each area (Q).

As for the uniform tariff (p), we use the average revenues per output as the uniform tariff. That is, the uniform tariff is defined as dividing total postal service revenues (TR) by total output (Q). In fact, as the Japan Post provides several kinds of services such as letters, cards, and parcel delivery services and each individual service has its own uniform tariff. However, as we treat a single output model in this study, we divide postal service revenues by a single output measure. Single

output measure (Q) is calculated based on Mizutani and Uranishi (2003).

(4) Step 4: Define the profit-making and the deficit-making areas

The unit profit of each area (π) is expressed as the difference of the uniform tariff and the average cost of the output ($\pi = p - AC$). The profit-making areas and deficit-making areas are identified by the unit profit of each area. The deficit-making area is identified by showing the negative unit profit as follows.

The profit-making areas if $\pi \geq 0$ in a area

The deficit-making area if $\pi < 0$ in a area

(5) Step 5: Estimation of the USO cost

The USO cost (C_{USO}) is defined as the total sum of deficits of the deficit-making areas as follows.

$$C_{USO} = \Sigma_m (\pi_m Q_m) \quad (5)$$

m: deficit-making area ($\pi_m < 0$, $m \in n$)

n: number of total areas

5.4. The Estimation of USO Costs and Policy Effects on USO Costs

In this section, we will evaluate how much the USO costs, by following the procedure which we explained in the previous section. The base case (Case 1) shows the current situation of the postal service in 2002. Furthermore, we will estimate two more cases: the case of the abolishment of the special post office (Case 2) and the case where privatization is carried out along with the abolishment of the special post office (Case 3).

For these cases, we will estimate the USO costs by following the procedure shown in the previous section. In order to estimate the USO costs, we make some assumptions. The important assumptions taken here are as follows.

First, in the case where the special post office is abolished (Case 2), we assume the costs of the post office are reduced by 20.1%, an assumption based on the result of cost model-1C in section 4. In the variable costs of the special post office, rental fees for buildings are included. Although based on Japan Post's report, the amount of rental fees of buildings paid for the special post office comprises about 10.3% of cost reduction, leading us to assume that the abolishment effect of the special post office is 9.8%[4].

[4] (The true effect of abolishing the special post office) = (the effect of the special post office in the cost

Second, we did not distinguish the managerial forms of the non-C&D type post office in the cost estimation because the number of non-C&D type ordinal offices is so low. In this estimation of the USO costs, we assume that the abolishment of the non-C&D type of special post office can also attain the same cost reduction of 9.8%.

Third, we assume that privatization also could reduce the cost of the post office. Although ownership is not the only factor relevant to efficiency, much empirical evidence supports the assertion that privatization attains productive efficiency (e.g. see Tittenbrun (1996)). The numerical information used here is followed by our econometric study on the privatization of the Japan National Railway (see Mizutani and Uranishi (2005)). Although Mizutani and Uranishi (2005)'s study pertains to the railway industry, there are similarities between the privatization of the Japan Post and that of the Japan National Railways. For example, at the first step, the ownership of the reformed organization remains in the public sector, although the management of the organization becomes more like that of a privately owned company. Furthermore, services which are considered non-marketable are supported by the government through the establishment of a special fund. Based on Mizutani and Uranishi (2005)[5], as a rough approximation of the effects of the privatization of Japan Post, we consider it acceptable to assume that the privatization effect is a 2.56% cost reduction in the first year and that the reduction rate thereafter declines annually.

The estimation results of the USO costs are summarized in Table 7. First, the current cost of the USO is about 348 billion yen, which accounts for about 17.3% of the total revenues of the postal service. Many people have observed that many areas (prefectures) are showing deficits, and indeed 38 areas are deficit-making. Thus, in the postal service division, about 9 profitable areas support many deficit-making areas in order to maintain the USO.

Second, when the special post offices are replaced by the ordinal post offices, the USO costs become about 273 billion yen, as Case 2 shows. That is a 21.5% reduction compared with Case 1. In Case 2, the share to total revenues of the postal services also decreases to 13.5%. Thus, the abolishment of the special post office reduces the USO costs considerably.

Last, the effects of privatization are shown in Case 3. As operating costs are reduced due to privatization, the USO costs are also reduced. However, the effects seem not large: the USO costs are about 251 billion yen, which represents only an 8% reduction, compared with Case 2. Furthermore, the deficit-making areas do not change much, compared with Case 2. The reduction effects based on Mizutani and Uranishi (2005)'s study are almost ending at about 12 years after privatization.

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function) – (the effect of the rental fees paid to the special post office) = 20.1% - 10.3% = 9.8%

[5] From Mizutani and Uranishi (2005)'s result, if other conditions are fixed at the sample mean, the privatization effect on the variable cost is obtained as follows: $\partial \ln VC / \partial R = -0.0280 + 0.0024R$, where VC: variable cost, R: time trend after privatization. The reduction rate of VC is diminishing and it turns to zero 12 years after privatization.

Table 7. The Effects of Special Post Offices on the USO Cost in 2002 (Real Value: Base Year = 2000)

	Case 1: Base Case	Case 2: Abolish Special Post Office	Case 3: Privatization with no special post office
USO cost (million yen)	348,469	273,429	251,462
Share of USO cost to total revenue	17.3%	13.5%	12.5%
Numbers of profit-making areas	9 (19.1%)	10 (21.3%)	12 (25.5%)
Numbers of deficit-making areas	38 (80.9%)	37 (78.7%)	35 (74.5%)

6. Concluding Remarks

The main purpose of this paper was to analyze the special post office and evaluate the magnitude of universal service obligation costs. In our previous study, Mizutani and Uranishi (2003), we found that the introduction of competition did not contribute to efficiency in the public agency (the Post Office), although many researchers have asserted that the competitive environment is important. Our unusual finding might be due to the existence of the special post office. From empirical analysis, we obtained the following results. First, the cost of the special post office is about 9.8% higher than that of the ordinal post office. Second, the USO costs are about 348 billion yen in the current situation. The USO costs account for 17.3% of total revenues of ordinal postal services. Furthermore, about 81% of total prefectures are classified as deficit-making areas. Third, if we abolish the special post office, the USO costs will be reduced to 273 billion yen. Last, even if privatization of the Japan Post achieves the improved performance seen in the case of the Japan National Railway, the USO costs will still be large at 251 billion yen. The special post office was usuful in the beginning in creating an extensive Japanese postal network, but their role may be unnecessary in a modern Japan. Our results imply that a reorganization of the Japan Post will be necessary.

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References

Bishop, M. R. and J. A. Kay, 1989. “Privatization in the United Kingdom: Lesson from Experience,” *World Development* 17(5): 643-657.

Bradley, M. D. and J. Colvin, 1995. “An Econometric Model of Postal Delivery,” In *Commercialization of Postal and Delivery Services: National and International Perspectives*, 137-153, edited by M. A. Crew and P. R. Kleindorfer. Boston: Kluwer Academic Publishers.

Bradley, M. D. and J. Colvin, 2000. “Measuring the Cost of Universal Service for Posts,” In *Current Directions in Postal Reform*, 29-46, edited by M. A. Crew and P. R. Kleindorfer. Boston: Kluwer Academic Publishers

Castro, M. and R. Maddock, 1997. “The Universal Service Obligation for Post: Some Australian Calculations,” In *Managing Change in the Postal and Delivery Industries*, 258-269, edited by M. A. Crew and P. R. Kleindorfer. Boston: Kluwer Academic Publishers.

Cazals, C., M. de Rycke, J. P. Florens and S. Rouzaud, 1997. “Scale Economies and Natural Monopoly in the Postal Delivery: Comparison Between Parametric and Non Parametric Specifications,” In *Managing Change in the Postal and Delivery Industries*, 65-80, edited by M. A. Crew and P. R. Kleindorfer. Boston: Kluwer Academic Publishers.

Crew, M. A. and P. R. Kleindorfer, 1998. “Efficient Entry, Monopoly, and the Universal Obligation in Postal Service,” *Journal of Regulatory Economics* 14: 103-125.

Harada, T. 2004. *True Story of Japanese Special Post Office (Tokutei Yubin Kyoku no Shinjitsu)*, Tokyo: Daiyamondo sya (in Japanese).

IPTP, 2000. *On Universal Service Obligation of Postal Service (Yubin no Yunibasal Sabisu no Arikata ni Tsuite)*, Ministry of Posts and Telecommunications (in Japanese). (http://www.japanpost.jp/pressrelease/japanese/yubin/001204j201.html#m22 :2006/02/23)

Japan Post, 2003. *Postal Service in Japan: Annual Report 2003*, Tokyo: Japan Post

Kay, J. A. and D. J. Thompson, 1986. “Privatization: A Policy in Search of Rationale,” *Economic Journal* 96:18-32.

Matsubara, S. 2001. *How Will Postal Services Be By Privatization (Yusei Mineika de Kou Kawaru)*, Tokyo: Kadokawa Shoten (in Japanese).

Ministry of Posts and Telecommunications, 1971. *Postal Service 100 Years History (Yusei 100 nenshi Shiryou)*, Vol.30, Tokyo: Yoshikawa Kobunkan (in Japanese).

Ministry of Posts and Telecommunications, 1991. *120 Years History of the Post Office (Yubin Sogyo 120 nen no Rekishi)*, Tokyo: Gyosei (in Japanese).

Mizutani, F. and S. Uranishi, 2003. “The Post Office vs. Parcel Delivery Companies: Competition Effects on Costs and Productivity,” *Journal of Regulatory Economics* 23:299-319.

Mizutani, F. and S. Uranishi, 2005. “The Effects of Privatization on Productivity and Capital Adjustment,” *Kobe University, Graduate School of Business Administration Discussion Paper* No.2005.5.

Nihon Keizai Shinbun, 2006. *Post Office: Read Over the Future Figure of Privatization (Yubinkyoku: Mineika no Miraizu wo Yomu)*, Tokyo:Nihon Keizai Shinbun (in Japanese).

Panzar, J. C., 1993. “Competition, Efficiency, and the Vertical Structure of Postal Services,” In *Regulation and the Nature of Postal and Delivery Services*, 93-105, edited by M. A. Crew and P. R. Kleindorfer. Boston: Kluwer Academic Publishers.

Robinson, R. and F. Rodriguez, 2000. “Liberalization of the Postal Market and the Cost of the Universal Service Obligation: Some Estimates for the UK,” In *Current Directions in Postal Reform*, 107-132, edited by M. A. Crew and P. R. Kleindorfer. Boston: Kluwer Academic Publishers.

Rodriguez, F. and D. Storer, 2000. “Alternative Approaches to Estimating the Cost of the USO in Posts,” *Information Economics and Policy* 12:285-299.

Segawa, K. 2005. *Postal Services: What is Asked (Yusei: Naniga Tomarete Iruka)*, Tokyo: Gendai Shokan (in Japanese).

Takenaka, H. 2005. *Privatization of Postal Services (Yusei Mineika)*, Tokyo: PHP Institute (in Japanese).

Takigawa, Y. 2004. *Objection To Privatization of Postal Services (Aete Yusei Mineika ni Hantai Suru)*, Tokyo: Nihon Hyoron-sha (in Japanese).

Tanaka, H. 2004. *Why is National Government’s Provision Wrong? (Kokuei deha Naze Ikenainodesuka: Kokyo Sabisu no Arikata wo Tou)*, Tokyo: Manejimento sya (in Japanese).

Tittenbrun, J. 1996. *Private Versus Public Enterprise: In Search of the Economic Rationale for Privatization*, London: Janus.

Uranishi, S. 2004. “Measuring the Cost of Universal Service Obligation for Posts (Yubin Jigyo ni okeru Yunibasaru Sabisu Kyokyu Kosuto no Keisoku), *Journal of Public Utility Economics (Koeki Jigyo Kenkyu)* 56(2):51-59 (in Japanese).

Yarrow, G. 1986. “Privatization in Theory and Practice,” *Economic Policy* 2:324-364

Yusei Koshaho Kenkyukai, 2004. *Japan Post Public Corporation Law (Shokai Nihon Yusei Koshaho)*, Tokyo: Gyosei (in Japanese).

Vickers, J. and G. Yarrow, 1991. “Economic Perspectives on Privatization,” *Journal of Economic Perspectives* 5(2): 111-132.