Privatization of Highway Public Corporations in Japan

by
Koji Ishimaru

Bachelor of Eng. Civil Engineering (1993)
The University of Tokyo

Master of Eng. Civil Engineering (1995)
The University of Tokyo

SUBMITTED TO THE DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF SCIENCE IN CIVIL AND ENVIRONMENTAL ENGINEERING
AT THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

JUNE 2002

Signature of Author _____
Department of Civil and Environmental Engineering
May 10th, 2002

Certified by _____
Fred Moavenzadeh
James Mason Crafts Professor of Engineering Systems
Department of Civil and Environmental Engineering
Thesis Supervisor

Accepted by _____
Oral Buyukozturk
Chairman, Departmental Committee on Graduate Studies

Privatization of Highway Public Corporations in Japan

by

Koji Ishimaru

Submitted to the Department of Civil and Environmental Engineering on May 10 2002
in Partial Fulfillment of the Requirements for the Degree of Master of Science
in Civil and Environmental Engineering

ABSTRACT

Japan has long been in a recession, and the politicians and the public have a consensus that the administrative and regulative reform is essential for to getting rid of the recession. The highway public corporations in Japan, such as the Japan Highway Public Corporation (JHPC), the Metropolitan Expressway Public Corporation (MEPC), the Hanshin Expressway Public Corporation (HEPC) and the Honshu Shikoku Bridge Authority (HSBA) are considered as ones of the sectors, which have the top priority for reform.

The objective of this thesis is to examine the problems of the highway public corporations and to suggest their privatization as a problem-solving driver. First, this thesis analyzes the financial aspect of the highway public corporations by examining the actual financial situation of the corporations. It also analyzes the managerial aspect of the corporation by observing decision-making systems for the development of new highway routes, and examines the degree of political and government intervention. Next, this thesis introduces the role of the public sectors in general and the reason why they do not have an incentive to improve productive and allocative efficiency. Then, it introduces the cases of denationalization of the Japan National Railways (JNR) and of Autostrade S.p.A., a highway concessionaire in Italy. These cases showed significant improvement of productive efficiency and financial soundness, and proved denationalization as one of the most effective tools for the reform of public sectors.

By understanding these general facts, privatization, especially denationalization of the highway public corporations in Japan, can be considered as the most possible solution for their financial and managerial reform. This thesis proposes a form of privatization to combine private ownership of profitable routes and vertical separation of unprofitable routes. This solves financial problems and still maintains their autonomous management. This thesis also suggests that the construction of new routes with a social or political objective should be suspended not to affect the financial situation of the privatized enterprises.

Thesis Supervisor: Dr. Fred Moavenzadeh

Title: James Mason Crafts Professor of Engineering Systems
Department of Civil and Environmental Engineering

Acknowledgments

I owe the completion of this thesis to many people who have supported and encouraged me during these two years and I would like to express my deepest appreciation to all of them.

Above all, Professor Fred Moavenzadeh gave me thoughtful comments on various topics relevant to my thesis despite his busy schedule. Without his insights, this thesis would not have been completed.
I would like to express my gratitude to my employer, Metropolitan Expressway Public Corporation (MEPC), my all superiors and colleagues in MEPC, and my partial sponsors, the Express Highway Research Foundation of Japan, the International Road Federation, and the Japan Road Association, who gave me this valuable opportunity to study at Massachusetts Institute of Technology. I will make the most of this investment and will not forget their consideration.
Many colleagues and friends have helped me collect information essential to the research and have given me valuable suggestions about the topics. I would like to thank them all. Bryan Goza at the Baptist Campus Ministry spent a lot of time with me and helped me correcting my English. Also, my colleagues at Construction Management Program, Takashi Imamura and Takeshi Sato, helped me in various occasions and shared this hard but enjoyable time of two years.

My last, but not least, acknowledgment goes to my wife, Hiroko, and my lovable sons, Keisuke, Jumpei, and Tomoki. They always encouraged me and adjusted their lives so that I might complete my research. This thesis is dedicated to my family.

Koji Ishimaru

Table of Contents

Exhibits

Chapter 1. Introduction

1.1. Background

Privatization of highway public corporations in Japan has been the hottest topic in Japan recently. The privatization of Japan Highway Public Corporation (JHPC), one of the highway public corporations in Japan, represents the degree, or percent, of how further administrative and regulatory reform of Japan is achieved. This is because JHPC is the largest among 77 special public corporations on a reformation list, and the most related public corporation for Japanese citizens' life.

The discussion of administrative and regulatory reform has become active since Junichiro Koizumi was elected Prime Minister of Japan in April 2001. He has been the most aggressive advocate of the reformation for Fiscal Investment and Loan Program (FILP), and he made a public pledge during the election for the Prime Ministry. Reflecting the unprecedented recession in Japan, the public accepted his attitude toward administrative and regulatory reform very positively with high expectation for some changes in Japanese politics and government. At the highest, the percentage supporting him became nearly 90% of the people were supporting him.

Before Koizumi, the Cabinet has already decided the outline of administrative and regulatory reform in December 2000. This outline describes that reform of public corporations is to be planned by the end of 2001 and is to be applied by the end of 2005. In August 2001, under Koizumi's leadership, examination of special public corporations started by the Cabinet's Secretariat for the Promotion of Administrative Reform to figure out how the reform should be done. In December 2001, a plan for restructuring public corporations was decided by the Cabinet and was opened to public. This plan sets forth privatization of four major highway public corporations as a premise, and it sets a term of action for March 2006.

Considering these current situations of the highway public corporations, it is very important to analyze their privatization from theoretical and practical points of view.

1.2. The Objective of the Thesis

The objective of the thesis is to recognize the problems that the highway public corporations in Japan have, and to suggest how they can be solved. The problems are categorized into financial and political aspects. Privatization, denationalization specifically, is applied to the public corporations in this thesis as a drastic problem-solving driver. It is applicable in terms of reforming financial structure of the organization and increasing productive efficiency.

The effect of privatization can be analyzed both from theoretical and practical points of view. To see the theoretical effect, the objective and efficiency of public sectors in general is discussed, and then the impact of denationalization is argued. To figure out practical consequences of denationalization, two cases are introduced from Japanese experience and from the experience of a similar highway concessionaire. By integrating ideas from both sides, it has become obvious that public sectors have several inefficiencies due to the lack of financial discipline and management autonomy, and that the situation will be dramatically improved by denationalization.

The solution for reform through denationalization is also suggested in this thesis as the case of JHPC. The effect is analyzed considering both denationalizing ownership and denationalizing only operation, and the combination of the two is suggested.

1.3. The Structure of the Thesis

The structure of the thesis is shown in Exhibit 1-1. The scope of the thesis is to analyze mainly the denationalization of public sectors that own and operate highway infrastructure and the effect of denationalization from financial and political aspects.

Chapter 1. Introduction: Chapter 1 introduces the advent of the privatization of public sectors as Japanese administrative and regulation reform,

addresses the objectives of the thesis, and shows the structure and the scope of the thesis.

Chapter 2. The Highway System in Japan: Chapter 2 introduces the institutional, political, and financial system of highway development in Japan. The characteristics of the four major highway public corporations are described, such as risks, financial situation, relationship with politics and governments, along with funding system of Japanese highway projects. The projects are arranged by the governments, such as Fiscal Investment and Loan Program (FILP) and Road Improvement Special Account (RISA). The financial statement of highway public corporations is analyzed during the process of reviewing the present financial situation, and it has turned out that the financial conditions of the highway public corporations are in problematic situation.

Chapter 3. The Privatization of Public Sectors: Chapter 3 describes the theoretical aspect of the effects of privatization, especially denationalization. In this chapter, the role of the public sectors and their inherent inefficiency is discussed, the definition of denationalization is introduced, and the process is shown how productive and allocative efficiency will be improved through denationalization of public sectors.

Chapter 4. The Cases of Privatization (Denationalization): Chapter 4 examines actual cases of privatization, especially denationalization. It examines cases including the privatization of Japan National Railways (JNR) and the privatization of Autostrade S.p.A. in Italy. This chapter introduces significant

operating improvements on efficiency in both cases after privatization. Also, the cases show that privatization has a large effect on improvement in financial soundness of the companies.

Chapter 5. The Application for Privatization of Highway Public Corporations: Chapter 5 analyzes the feasibility of debt repayment for the highway public corporations, and concludes that the feasibility is very low. Therefore, in this chapter, the privatization is applied to the highway public corporations in Japan as a problem-solving driver, and the effect of the privatization is discussed in terms of financial discipline and avoiding political interferences. Also, the form of privatization is argued specifically for the case of JHPC, and the combination of the vertical separation and the private ownership of highway assets are suggested.

Chapter 6. Conclusion: Chapter 6 summarizes the thesis and concludes with lessons learned through the research.

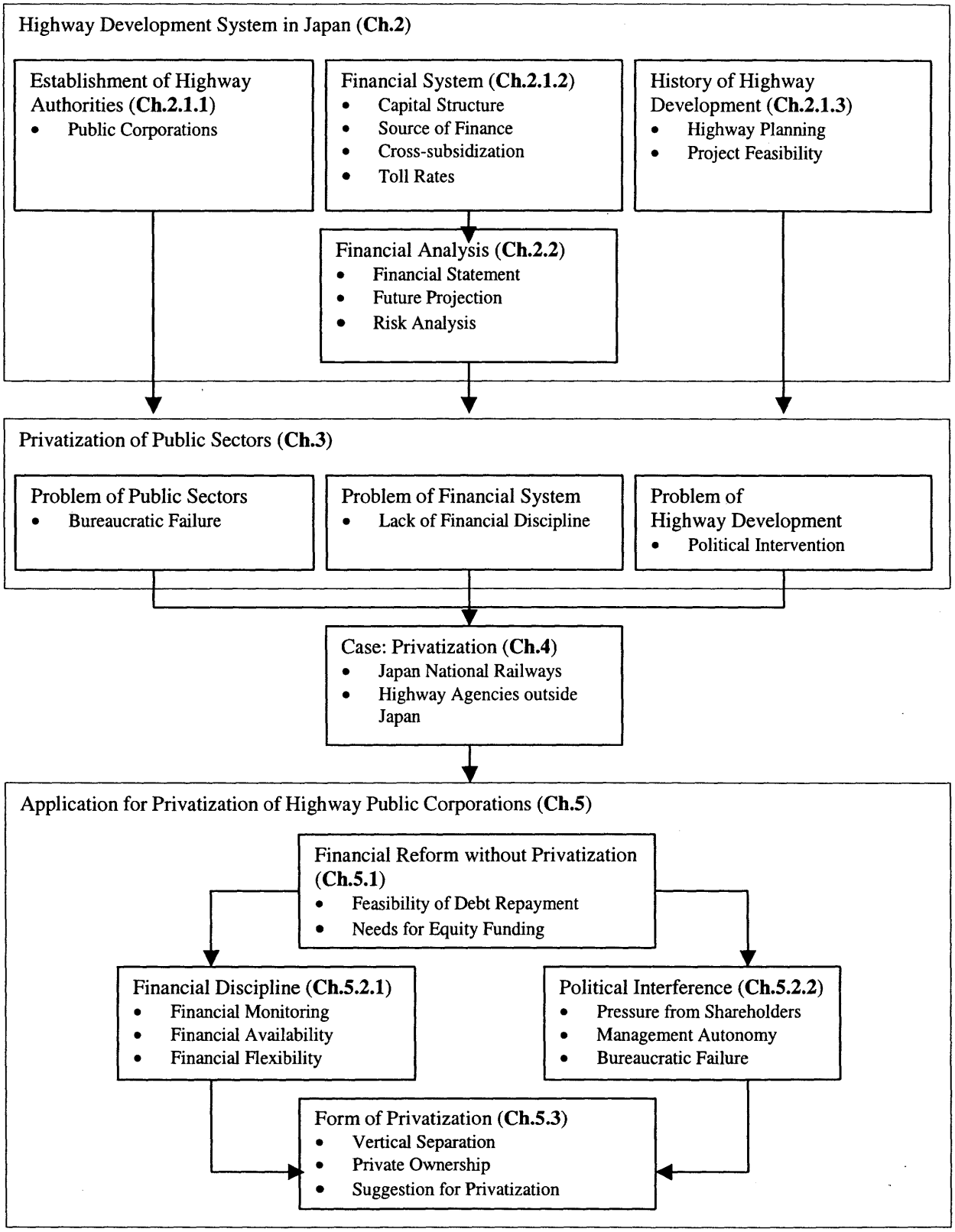


Exhibit 1-1 Structure of Thesis

Chapter 2. Highway System in Japan

2.1. System of Highway Development in Japan

Japan's extensive multi-modal transportation system is among the highly developed in the world. It consists of nearly 1.2 million kilometers (750,000 miles) of road network and 23,000 kilometers (14,400 miles) of rail network (World Bank et al, 1999). Among road network, there are 7,000 kilometers of national motorways [1] network all over Japan, 800 kilometers of regional motorways[2], and nearly 700 kilometers of urban expressways in major urban areas such as Tokyo or Osaka.

2.1.1. Organizational System

Highway Public Corporations

Toll roads are constructed and operated by several highway authorities. In Japan, they are usually called public corporations. There are four main highway

[1] National Motorways are high-speed roads for vehicles and are designated to constitute the backbone of the nation's road network.
[2] Regional Motorways are constructed for the purpose of easing traffic congestion in urban areas, providing reliable traffic means for remote areas, and developing local industry particularly tourism.

public corporations: (1) Japan Highway Public Corporation (JHPC), (2) Metropolitan Expressway Public Corporation (MEPC), (3) Hanshin Expressway Public Corporation (HEPC), and (4) Honshu-Shikoku Bridge Authority (HSBA). JHPC is a state-owned enterprise, and the others are half state- and half local-government-owned enterprises. Also, there are several highway public corporations owned 100% by local governments in addition to these four major highway public corporations (see Exhibit 2-1).

(km)	March 1961	March 1971	March 1981	March 2002
JHPC	369	1,448	3,665	7,675
National Motorways	0	649	2,860	6,861
Regional Motorways	369	799	805	824
MEPC	0	90	139	263
HEPC	0	74	103	221
HSBA	0	0	7	173
Other Urban Expressway Public Corporations	0	0	21	132
Nagoya	0	0	11	47
Hiroshima	0	0	0	7
Fukuoka and Kita-Kyushu	0	0	10	79
Local Expressway Public Corporations (43 corp.)	0	0	870	1236
Local Government	8	583	770	47
Total	377	2,195	5,575	9,747

Exhibit 2-1 Length of Highways by Highway Public Corporations[3]

Modern toll road development in Japan started in 1952. The former "Law concerning Special Measures for Highway Construction" in 1952 was enacted to

[3] Ministry of Land, Infrastructure and Transport, "*Doro Kankei Kodan no Gaiyo* (in Japanese, the Outline of the Highway Public Corporations)," http://www.mlit.go.jp/road/ir/hyouka/kodan/gaiyo/gaiyo.html, December 2001

make it possible to develop toll roads by using Fiscal Investment and Loan Program (FILP, described in 2.1.3.1) and by redeeming debts with toll revenues.

Japan Highway Public Corporation (JHPC)

Motorization was grown dramatically as the economy recovered after World War II. The number of motor vehicles was 130,000 in 1945, reached 500,000 vehicles by 1951, then doubled to 1,000,000 in 1953, and doubled again to 2,000,000 in 1957.

From 1952 when the former "Law concerning Special Measures for Highway Construction" was enacted, the Ministry of Construction (MOC, now restructured as the Ministry of Land, Infrastructure and Transport, MLIT) directly undertook construction of toll roads. However, the Road Council submitted report in 1955 advising the establishment of a special public toll road agent to provide the integrated construction and management of toll roads because the lack of overall project coordination led to disjoined development. Thus, JHPC was established in April 1956 in order to undertake national and regional toll road development, and all toll road projects under MOC were transferred to JHPC. Also, at that time, Ralph J. Watkins, an economist invited by the Japanese government to conduct research for the Meishin (Nagoya-Kobe) Expressway in 1956, says, "the roads of Japan are incredibly bad. No other industrial nation has so completely neglected its highway system." He pointed out that the first Five-year Road Improvement Program started in 1954 had to be

at least tripled in scale. The road conditions in those days were indeed terrible, and the Japanese government accepted Mr. Watkins's proposals and immediately put them into practice.

JHPC is an enterprise owned by the national government. Currently as of March 2002, it operates all of 6,861 km of national motorway network (Exhibit 2-2) and 824 km of regional motorways (Exhibit 2-3). (For the difference between national motorways and regional motorways, see 2.1.3.2)

Metropolitan Expressway Public Corporation (MEPC)

Rapid urbanization in 1950s led rapid growth of traffic demand in urban areas. The population in Tokyo was about 3.5 million in 1945, and increased to 8 million in 1955, then 10 million in 1962. Also, the number of registered motor vehicles in Tokyo has dramatically increased from 44,000 in 1945 to 1 million in the mid-1960s. However, road development was not sufficient to deal with the rapid increase of traffic demand. Total area of roads in Tokyo accounted for only 10% of land area, while it was 35% in New York and 23% in London at that time[4]. Therefore, MEPC was established in 1959 to build and operate Metropolitan Expressways to cope with the problem.

As of January 2002, it operates 270.4 km of Metropolitan Expressways in Greater Tokyo area, mainly in Tokyo, Yokohama, and Kawasaki areas (see Exhibit 2-4).

---

[4] Source: MEPC, "The Tokyo Metropolitan Expressway," 2000

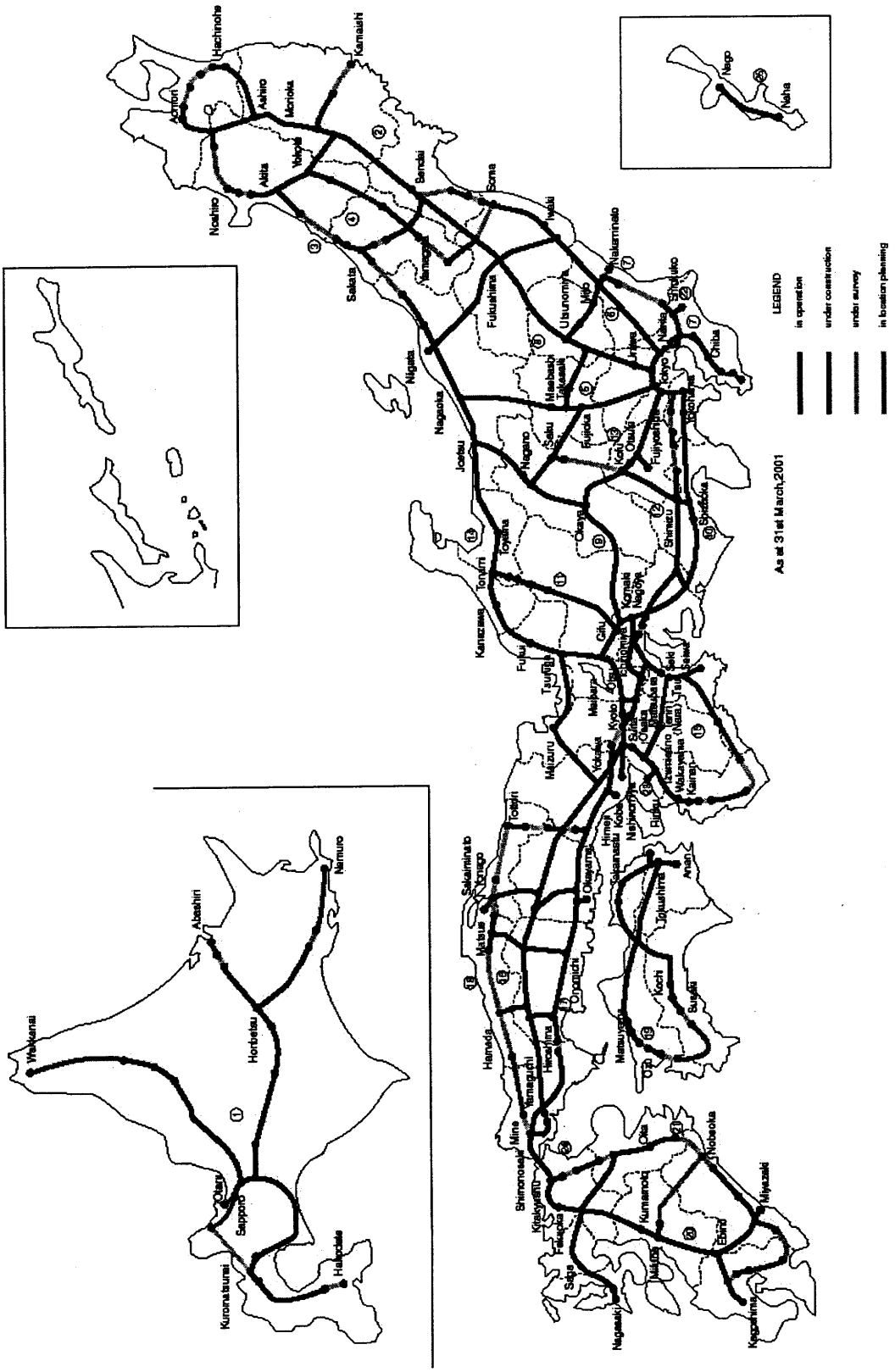
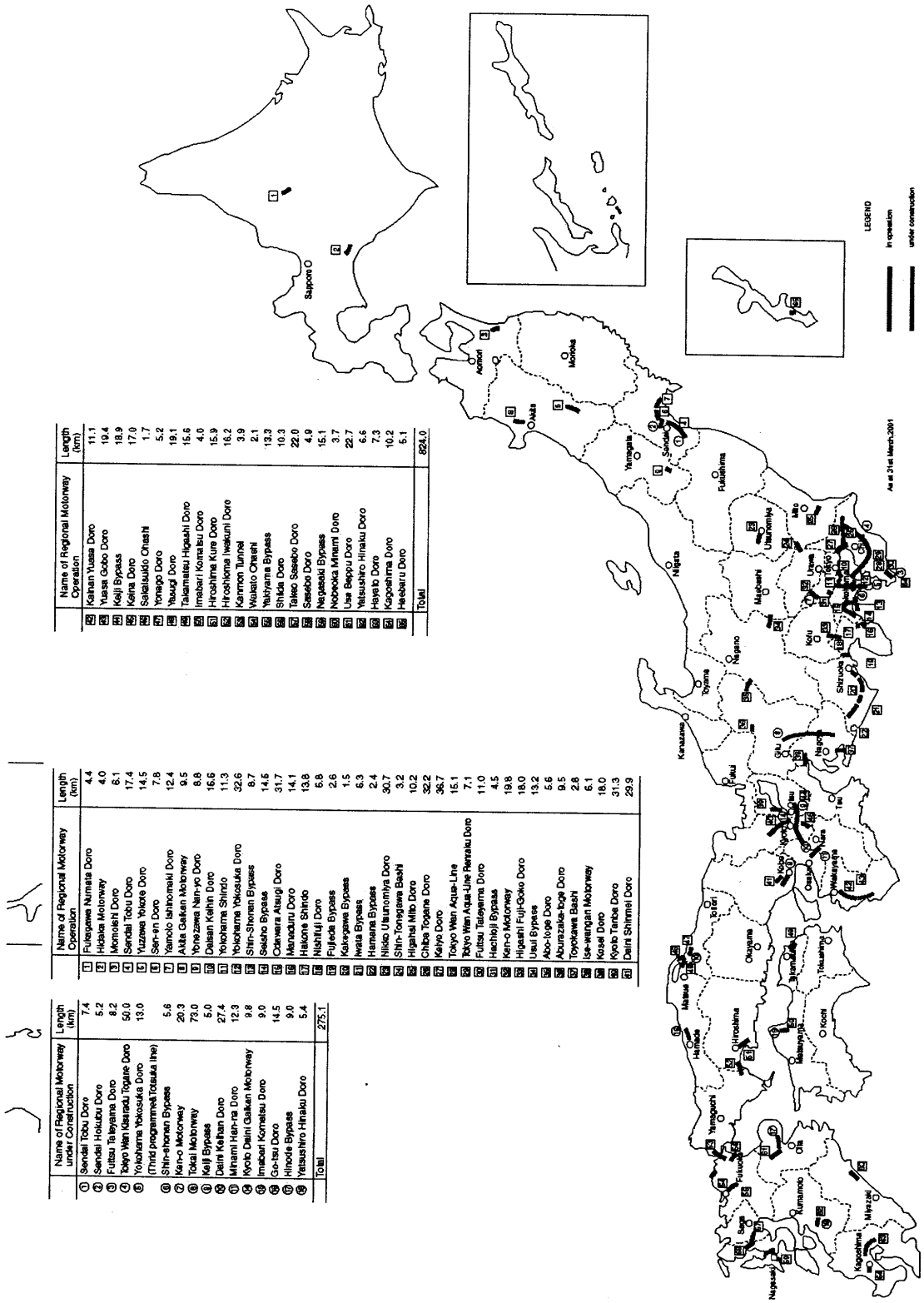


Exhibit 2-2 Network of National Motorways



	Name of Regional Motorway Operation	Length (km)
29	Kaihan Yuasa Doro	11.1
30	Yuasa Gobo Doro	19.4
31	Keiji Bypass	18.9
32	Keina Doro	17.0
33	Sakaisuido Ohashi	1.7
34	Yonago Doro	5.2
35	Yasugi Doro	19.1
36	Takamatsu Higashi Doro	15.6
37	Imabari Komatsu Doro	4.0
38	Hiroshima Kure Doro	15.9
39	Hiroshima Iwakuni Doro	16.2
40	Kanmon Tunnel	3.9
41	Wakato Ohashi	2.1
42	Yukiyama Bypass	13.3
43	Shiida Doro	10.3
44	Takeo Sasebo Doro	22.0
45	Sasebo Doro	4.9
46	Nagasaki Bypass	15.1
47	Nobeoka Minami Doro	3.7
48	Usa Beppu Doro	22.7
49	Yatsushiro Hinaku Doro	6.6
50	Hayato Doro	7.3
51	Kagoshima Doro	10.2
52	Haebaru Doro	5.1
	Total	224.0

	Name of Regional Motorway Under Construction	Length (km)
1	Sendai Tobu Doro	7.4
2	Sendai Hokuzu Doro	5.2
3	Futtsu Takeyama Doro	8.2
4	Tokyo Wan Kiwadu Togane Doro	50.0
5	Yokohama Yokosuka Doro	13.0
6	(Third progamme&Tosuka line)	
7	Shin-ehonan Bypass	5.6
8	Kan-o Motorway	20.3
9	Tokai Motorway	73.0
10	Keiji Bypass	5.0
11	Daini Keihin Doro	27.4
12	Minami Han-na Doro	12.3
13	Kyoto Daini Gaikan Motorway	9.8
14	Imabari Komatsu Doro	9.0
15	Go-Isu Doro	14.5
16	Hinode Bypass	9.0
17	Yatsushiro Hinaku Doro	5.4
	Total	275.1

	Name of Regional Motorway Operation	Length (km)
1	Fukegawa Numata Doro	4.4
2	Hidaka Motorway	4.0
3	Monoishi Doro	6.1
4	Sendai Tobu Doro	17.4
5	Yuzawa Yokote Doro	14.5
6	Sen-en Doro	7.8
7	Yamoto Ishinomaki Doro	12.4
8	Akita Gaikan Motorway	9.5
9	Yonezawa Nan-yo Doro	8.8
10	Daisan Keihin Doro	16.6
11	Yokohama Shindo	11.3
12	Yokohama Yokosuka Doro	32.6
13	Shin-Shonan Bypass	8.7
14	Seisho Bypass	14.6
15	Odawara Atsugi Doro	31.7
16	Manaduru Doro	14.1
17	Hakone Shindo	13.8
18	Nishifuji Doro	6.8
19	Fujieda Bypass	2.6
20	Kakegawa Bypass	1.5
21	Iwata Bypass	6.3
22	Hamana Bypass	2.4
23	Nikko Utsunomiya Doro	30.7
24	Shin-Tonegawa Bashi	3.2
25	Higashi Mito Doro	10.2
26	Chiba Togane Doro	32.2
27	Keiyo Doro	36.7
28	Tokyo Wan Aqua-Line	15.1
29	Tokyo Wan Aqua-Line Renraku Doro	7.1
30	Futtsu Takeyama Doro	11.0
31	Hachioji Bypass	4.5
32	Ken-o Motorway	19.8
33	Higashi Fuji-Goko Doro	18.0
34	Usui Bypass	13.2
35	Abo-toge Doro	5.6
36	Aburazaka-toge Doro	9.5
37	Toyokawa Bashi	2.8
38	Ise-wangan Motorway	6.1
39	Kosei Doro	18.0
40	Kyoto Tanba Doro	31.3
41	Daini Shinmei Doro	29.9

Exhibit 2-3 Regional Motorways

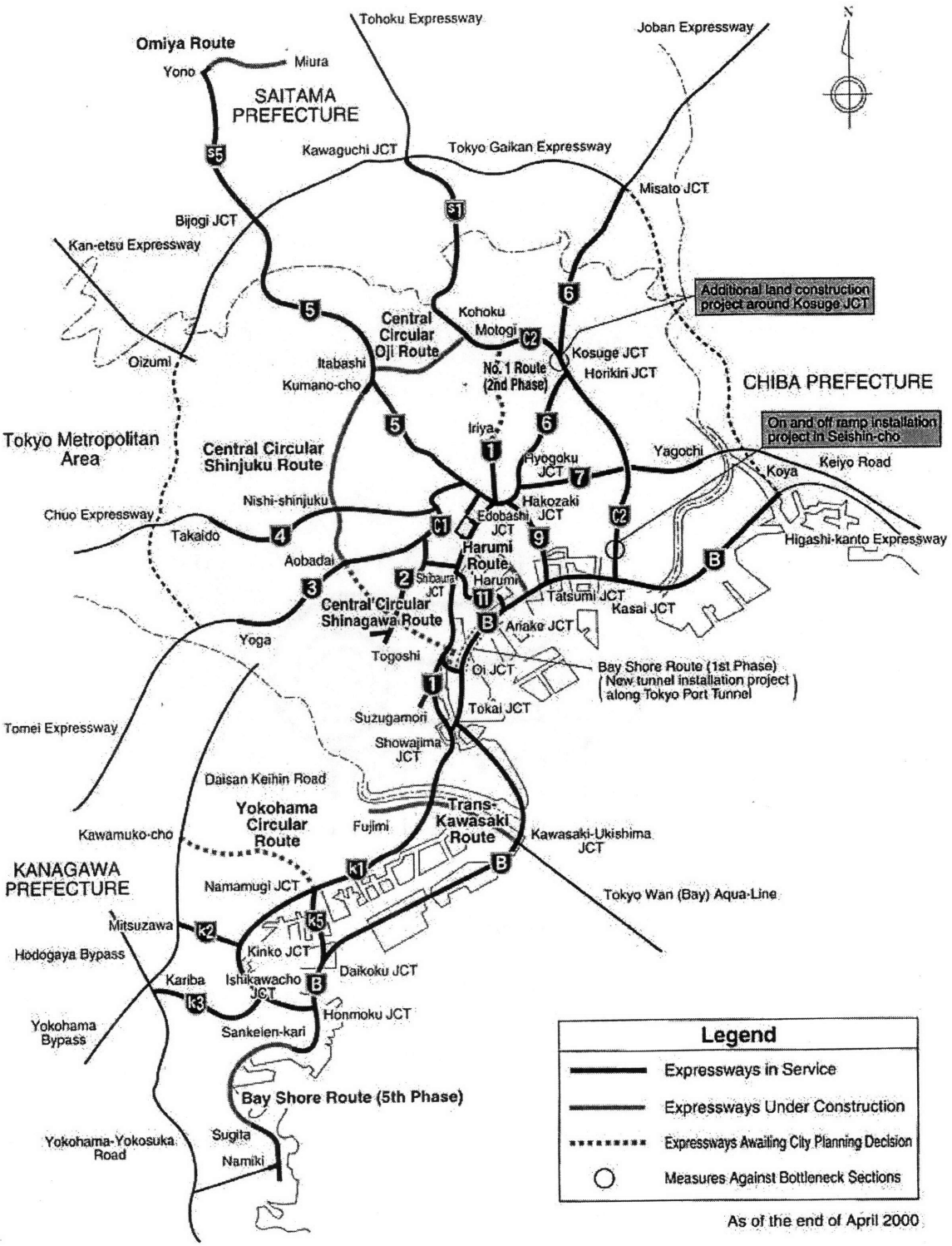


Exhibit 2-4 Network of Metropolitan Expressways

Hanshin Expressway Public Corporation (HEPC)

At the same token, HEPC was established to operate Hanshin [5] Expressways in 1962. Now it operates 221.2 km network in Osaka, Kobe and Kyoto areas (Exhibit 2-5).

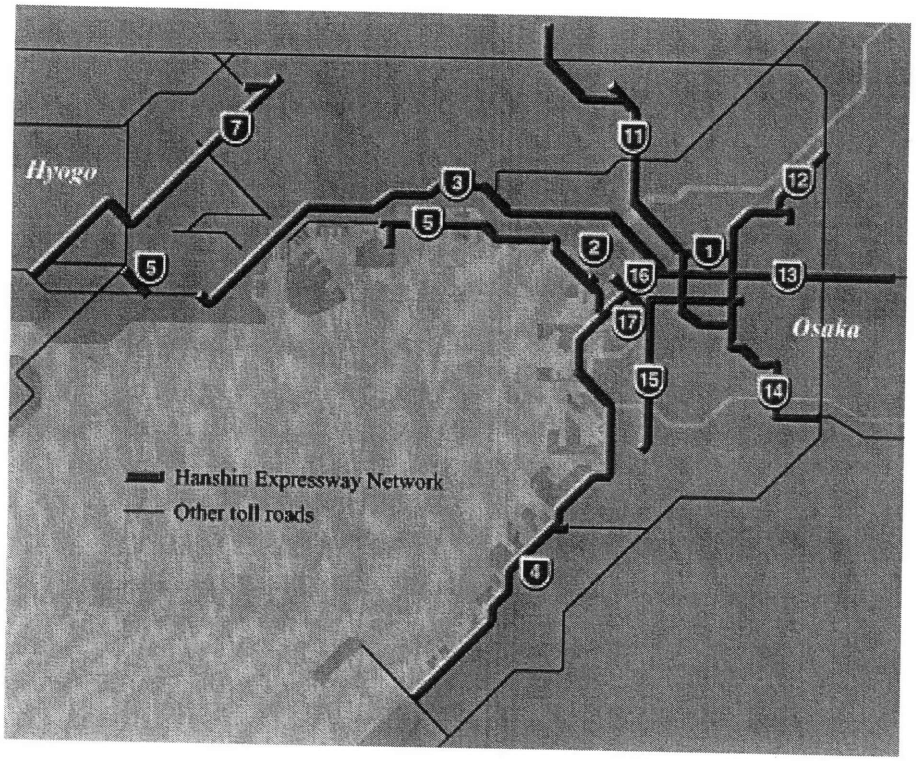


Exhibit 2-5 Network of Hanshin Expressways

Honshu-Shikoku Bridge Authority (HSBA)

HSBA was established in July 1970 with the goal of smoothing out the traffic flow between Honshu Island and Shikoku Island by building bridges between the two islands. The bridges are expected to enhance the sound development of the nation by connecting the two islands with three routes, Nishiseto Expressway, Seto-Chuo Expressway, and Kobe-Awaji-Naruto

[5] Abbreviation of Osaka-Kobe corridor.

Expressway (Exhibit 2-6). Honshu-Shikoku Bridge Authority Law specifies that HSBA is responsible for the following work: (1) construction, operation, and maintenance of three expressways that link Honshu and Shikoku, (2) construction and maintenance of railroads that link Honshu and Shikoku, and (3) lease of railway facilities to railway companies.

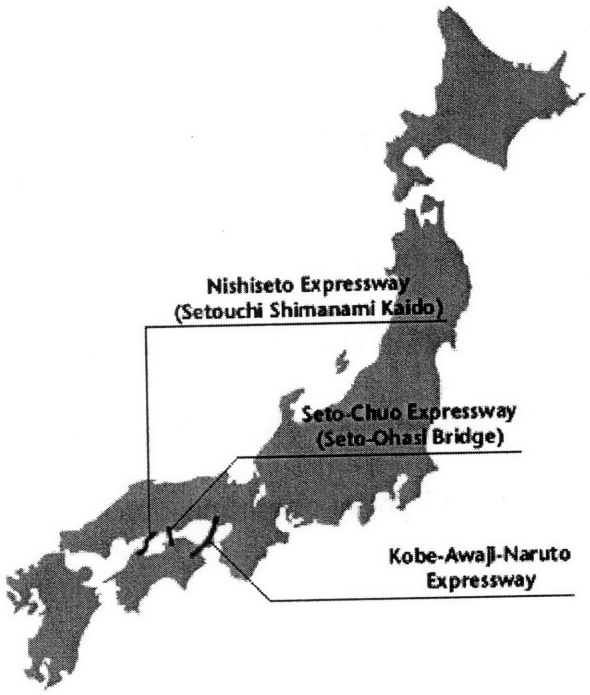


Exhibit 2-6 Honshu Shikoku Bridges

2.1.2. Development System

For the construction of new highway routes, the highway public corporations are required to have its plan authorized by the national government. For example, JHPC is required to get approval for its plan in four steps: (1) the proposed plan, (2) the basic plan, (3) the construction plan, and (4) the construction order.

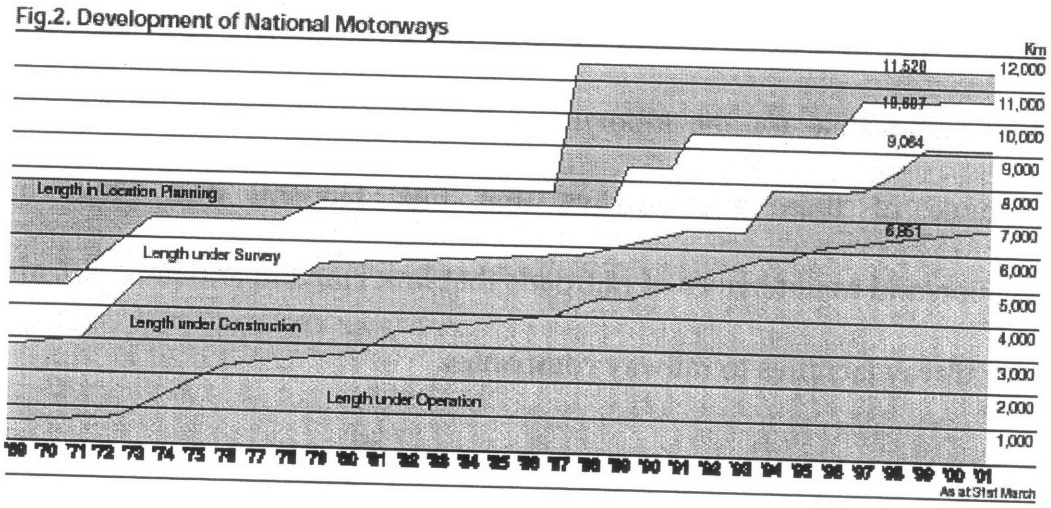


Exhibit 2-7 Development of National Motorways[6]

Exhibit 2-7 shows the length of national motorways in the proposed plan (location planning, in the exhibit), and in the basic plan (under survey, in the exhibit), and the length of highways, which are ordered their construction (under construction, in the exhibit), and under operation.

The Proposed Plan by Law

The Law for Construction of Arterial Motorways for National Land Development in 1966 called for the construction of 32 routes, 7,600 km of national motorways. Key-features of this law included; (1) constructing nine longitudinal back-bone motorways, six transverse rib-like motorways, and seven other routes; (2) connecting cities with 100,000 or more inhabitants; and (3) bringing motorways within a two-hour drive of majorities of car users.

[6] Source: JHPC, Annual Report 2001

Since 1987, when 4,280km of authorized 7,600km motorway was completed, the law has been amended to expand the national motorway plan. The 1987 amendment has authorized the construction of 47 routes, 11,520 km of national motorways, and 180km of Honshu-Shikoku Bridges. The key features of this plan included: (1) strengthening ring toll roads for major cities; (2) strengthening links to/from major airports and seaports; (3) bringing toll roads within a one-hour drive of the majority of households in the country; (4) constructing alternative routes to cope with the impact of natural disasters such as earthquakes or typhoons; and (5) reducing traffic congestion on expressway in operation.

The Basic and Construction Plans supervised by House Members

MLIT authorizes the basic plan and the construction plan under the supervision of the National Motorway Council. The construction plan is authorized after the assessment of environmental impacts. The Council consists of six members of the House of Representatives, four members of the House of Councilors, and ten people of academic standing. The Prime Minister calls the Council when it is necessary. For example, the Council is called in 1998 and in 1999 to deal with economic countermeasure against recession, and some routes have been added to the basic plan. Thus, the plan is highly connected with politics and national economic policy. The length of highway under the Basic Plan and the Construction Plan has become 10,607km and 9,342km respectively since December 1999.

The Construction Order to JHPC by MLIT

After JHPC conducts the research of the new routes listed in the construction plan, MLIT orders JHPC to construct the new routes. The role of JHPC is mainly after the construction order. It is to make an execution plan of the construction for a budget approval from MLIT, to conduct survey, to take right-of-ways, to manage design and construction by contracting it out to contractors, and to operate and maintain toll roads after opening to traffic. As of December 2000, the length of the highway that was ordered the construction is 9,064km.

Development System of Urban Expressways

For urban expressways such as Metropolitan Expressways or Hanshin Expressways, local governments play a role in the development system in terms of city planning. The first procedure to develop new routes is to have new route plan included in the city planning decision by local governments. After the role by the local governments, MLIT, i.e. the national government, directs the Basic Plan including the development of the new routes to the public corporations. Then, the Construction Execution Plan is prepared by the public corporations, and is approved by MLIT. Also, the City Planning Project Approval is made by MLIT. In urban expressway development, there is no political supervision such as the National Motorway Council, and there is less political intervention in urban areas than in rural areas.

Budget Approval

The highway public corporations in Japan prepare a budget, a project plan, and a financial plan for each fiscal year. The budget and these plans need approval from the Minister of Land, Infrastructure and Transport. Thus, MLIT supervises the highway public corporations. However, the budgets of public corporations themselves do not need approval from the national Diet or local assemblies. Therefore, there is no specific monitoring system by the public to check their business.

2.1.3. Toll Road Financing System

There are four major points about toll road financing system in Japan:

(1) Mostly funded by debts;

(2) Mostly funded by governments;

(3) Toll Revenue Pooling system is implemented to national and urban networks of toll road except for regional motorways; and

(4) After redemption by toll revenues for a certain period, toll roads will be freeways.

In this section, each point is described in detail.

2.1.3.1. Capital Structure and Source of Finance

Capital Structure of Highway Public Corporations

Capital structure of highway public corporations in Japan is mainly funded by debts rather than equity. The ratios of debt over contributed capital and the debt to equity ratios of four public corporations are shown in Exhibit 2-8. The ratios especially the one of debt over contributed capital are much higher compared with toll road concessionaires around the world (for Autostrade, see Chapter 4.2). These high ratios indicate that public corporations, and in turn toll road users, bear heavy interest payments derived by large amount of debts compared with their equity.

		Debt/ Contributed	Debt to Equity Ratio
JHPC	FY2000	13.0	4.2
MEPC	FY1999	8.5	4.7
HEPC	FY1999	8.1	7.6
HSBA	FY1999	5.6	-6.2
Autostrade, Italy	FY2000	2.7	0.9
407 ETR, Canada	FY2001	5.7	8.5
City Link, Australia	FY2001	0.9	

Exhibit 2-8 Debt/Equity Ratios

Most of the debts are either directly funded by governments or guaranteed by the national government. For example in JHPC, in FY2000[7], debts funded by government comprised 78% of total outstanding debts. When government

[7] In FY2001, the FILP was fundamentally reformed. However, the previous system had been implemented since 1956, and it is easier to understand financing system of toll roads in Japan by explaining the previous system. Therefore, the financing of FY2000 is used in this chapter, rather than FY2001.

guaranteed bonds are included, government contribution will comprise 84% of total debt outstanding. Equity is all funded by governments. (Exhibit 2-9)

(As of March 31st, 2001)			Amount Outstanding* (Billion Yen)	%		Program
Debts	Funded by Governments	Bonds purchased by Government	17,805.2	69%	78%	FILP
		Loan from Government	2,259.9	9%		FILP
	Funded by Non-governments	Bonds guaranteed by Government	1,664.6	6%	22%	FILP
		Loan from Financial Institutions	2,363.0	9%		
		Bonds issued in Foreign Market	466.8	2%		
		Bonds issued privately	1,078.7	4%		
	Total Debts		25,638.2	100%		
Funded by Governments		Equity funded by Government	1,980.1			
		Government Subsidies**	1,776.5			

* Amount Outstanding does not included interest.
** Government Subsidies are not necessary to repay. Therefore, the amount here is total of subsidies since 1956.

Exhibit 2-9 Outstanding Principal of Debts and Equity for JHPC[8]

Debts funded or guaranteed by government are under Fiscal Investment and Loan Program (FILP). Equity and subsidies are funded from Road Improvement Special Account (RISA).

Although government increases funding on equities and subsidizing public corporations, most of the government contribution is still in the form of debts through FILP. Exhibit 2-10 shows the amount of debts and equity contributed by the government.

[8] Source: JHPC, Annual Report 2001

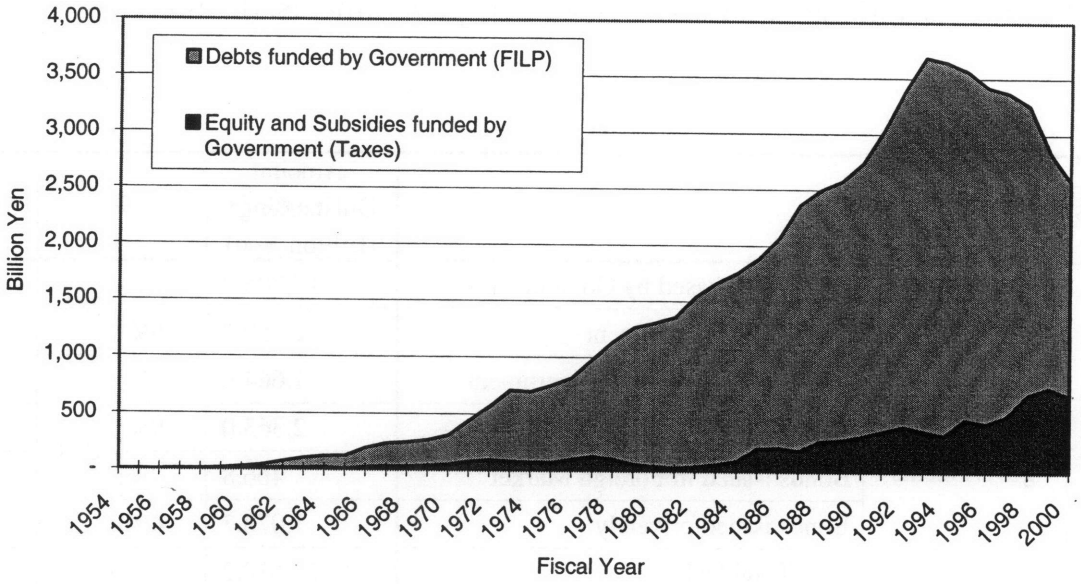


Exhibit 2-10 The Amount of investment on Toll Road Projects by the Governments[9]

Fiscal Investment and Loan Program (FILP)

Fiscal Investment and Loan Program (FILP, also translated as Treasury Investment and Loan) is a program managed by Ministry of Finance in Japan (MOF). The source of FILP is mainly from Postal Savings, Pension Reserves, and Postal Life Insurance Reserves (Exhibit 2-11). Especially, Postal Savings in Japan has huge amount of savings from citizens, and the amount as of FY1999 is 255 trillion yen (US$ 2 trillion[10]). FILP financing is allocated to the national or local

[9] Source: MLIT, "*Doro Tokutei Zaigen ni kansuru Data-shu* (in Japanese, Data about Road Improvement Special Account)," http://www.mlit.go.jp/road/zaigen/zaigen.htm, December 1997

[10] US$1 = 130yen

governments, government-affiliated agencies and other public corporations that are legally supervised by the government.

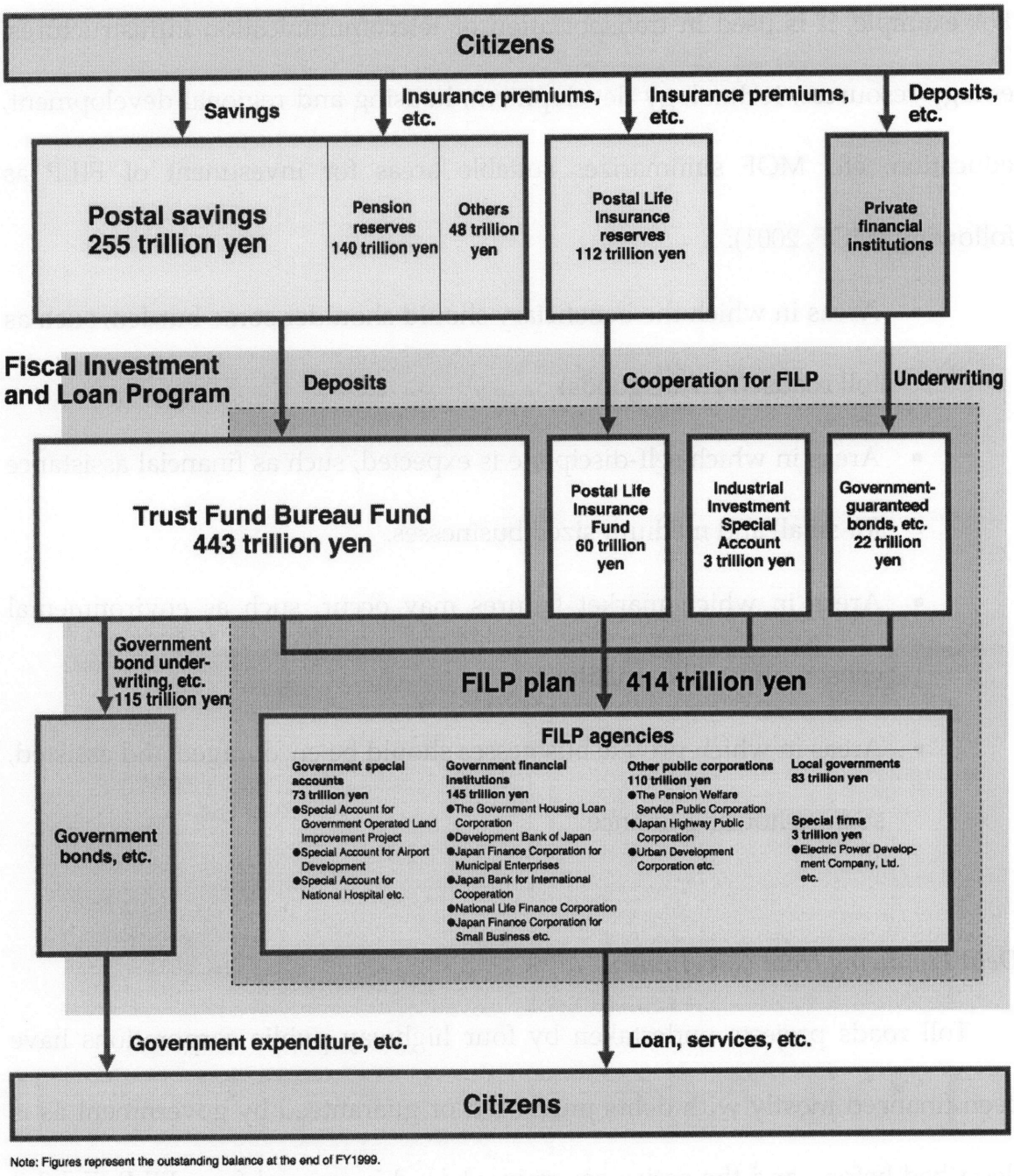


Exhibit 2-11 Money Flow of Fiscal Investment and Loan Program[11]

[11] Source: Ministry of Finance in Japan, FILP Report 2000, http://www.mof.go.jp/zaito/zaito00e.html, February 2001

FILP is used in infrastructure projects for private goods[12] as opposed to public goods, and projects of goods with externalities[13] (World Bank et al, 1999). For example, it is used in transportation or telecommunication infrastructures, energy resources, technology development, housing and regional development, education, etc. MOF summarizes suitable areas for investment of FILP as following (MOF, 2001):

- Areas in which the beneficiary should shoulder some burden, such as toll roads. (Private goods)
- Areas in which self-discipline is expected, such as financial assistance for small and medium-sized businesses.
- Areas in which market failures may occur, such as environmental conservation. (Externalities)
- Areas in which private businesses should be encouraged and assisted, such as housing finance.

Debt Financing from Government

Toll roads projects undertaken by four highway public corporations have been financed mostly with debts purchased or guaranteed by government as is described before, and the entire government fund is sourced from FILP (Exhibit 2-9). There are three kinds of debt issued through FILP: (1) Bonds purchased by

[12] Definition of private goods is the goods with exclusivity (consumers must pay fee for service).
[13] There is externality in the service whose benefits or costs are spread not only to users but also to society.

the national government (from Trust Fund Bureau Fund and Postal Life Insurance Fund, see Exhibit 2-11); (2) Loans from the national government (from Trust Fund Bureau Fund); and (3) Bonds guaranteed by the national government. The government guaranteed bonds are issued by public corporations to financial institutions in the form of public offering, and their principal and interest payments are guaranteed through the funds of FILP. With this system, government bear the financial risk of toll road projects, and this made it possible to utilize private sector finance for accelerated toll road development. The maturity of bonds both purchased and guaranteed by the government is 10 years.

Debt Financing from Private Sectors

On the other hand, there are several bonds issued by public corporations themselves to the financial market (see Exhibit 2-9 and Exhibit 2-12): (1) loans from financial institutions, (2) bonds issued privately, and (3) foreign currency bonds. First, highway public corporations borrow loans from a number of different financial institutions. For example, JHPC borrows money from 76 different Japanese banks, six different trust banks, 22 life insurance companies, and four other financial institutions. The loans have the repayment terms of seven to fifteen years. Second, bonds issued privately are purchased by the financial institutions that have business connections with public corporations. The bonds have a maturity of ten years. Lastly, bonds in foreign currency have been issued by JHPC since 1983, mainly in US dollars. The maturity of the bonds

is 10 years. With the FILP reforms, bonds in foreign market have been guaranteed by the national government through FILP in exchange of elimination of bonds purchased by the government since FY2001.

Exhibit 2-12 shows interest rates of bonds issued by JHPC. For the domestic bonds, interest rates are not so different among the type of debts. However, interest rates of foreign currency bonds are much higher than domestic bonds reflecting the difference in domestic and foreign economic situation.

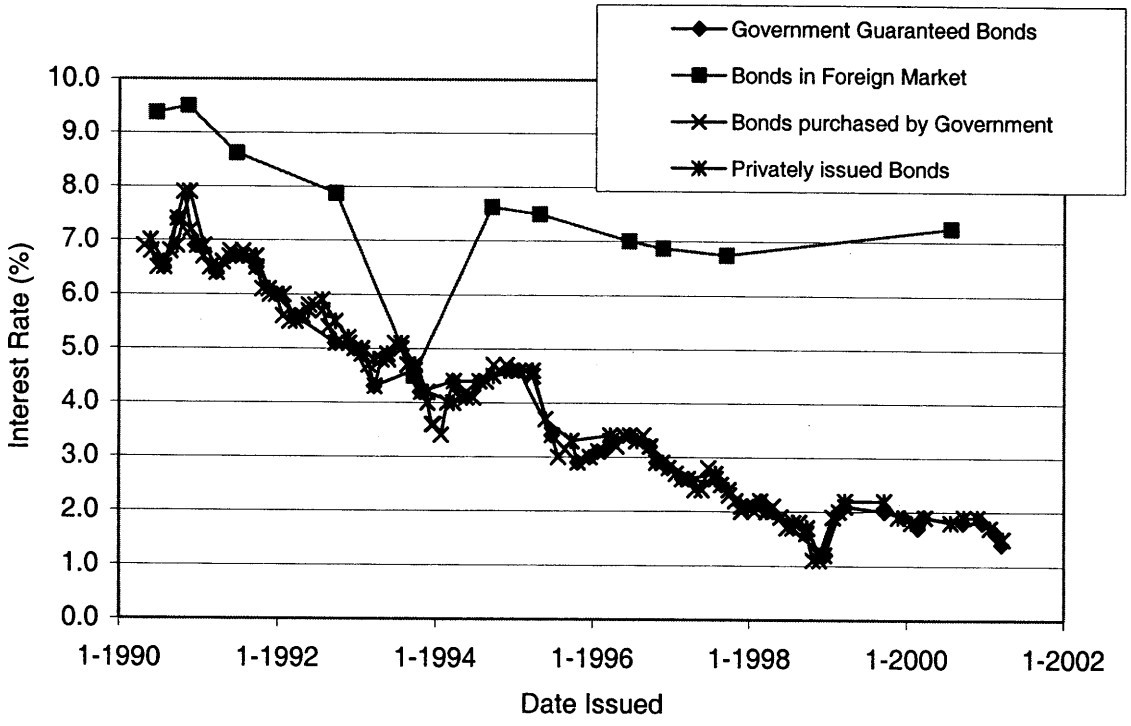


Exhibit 2-12 Interest Rates of Debts[14]

[14] Japan Highway Public Corporation, "*Gyosei Cost Keisansho ni tsuite* (in Japanese, the Statement of Governmental Costs)," Press Release http://www.jhnet.go.jp/press/rel/2001/09/28/, September 2001

In the early years, the World Bank played an important role in financing Japanese toll roads development. It provided loans for the construction of Meishin (Nagoya-Kobe) and Tomei (Tokyo-Nagoya) expressways, which are completed in 1965 and 1969 respectively. They linked Japan's industrial corridors along the Pacific coast. Financing for the Meishin and Tomei expressways from the World Bank accounted for 35% and 32% of total construction cost, respectively, while the others were from FILP. The borrowing has already been all repaid to the World Bank.

Equity Financing

The entire equity of public corporations is funded directly from governments. JHPC is funded only by national government, and the other three regional public corporations are funded half by national government and half by related local governments. Equity is financed mostly from the Road Improvement Special Account.

Subsidy from Government

The national government subsidizes the interest payment for certain less profitable routes[15] of JHPC to offset the amount equivalent to the difference between certain notional interest rates[16] and actual interest rates on debts. Thus,

[15] Total of 13 routes are designated as routes to receive government subsidies for interest payments.
[16] 3% as of March 2001.

government plays a large role to accelerate the development of highways in rural areas by accepting a part of financial risk.

Road Improvement Special Account (RISA)

<table>
<tr><th colspan="4">Tax Revenues Earmarked for Road Improvement (FY2000)</th></tr>
<tr><th></th><th>Fuel Consumption</th><th>Purchase of Motor</th><th>Possession of Motor Vehicle</th></tr>
<tr><td>Gasoline-Powered Motor Vehicles</td><td>Gasoline Tax (National tax)
(Temporary Tax Rate: 48.6 yen/liter)
(Legal Tax Rate: 24.3 yen/liter)
2,771.4 bil. yen
Local Road Transfer Tax (Local tax)
(Temporary Tax Rate: 48.6 yen/liter)
(Legal Tax Rate: 24.3 yen/liter)
292.9 bil. Yen</td><td rowspan="3">Motor Vehicle Purchase Tax
(Local tax)
(Temporary Tax Rate: 5% of purchase price for private car)
(Legal Tax Rate: 3% of purchase price)
455.6 bil. yen</td><td rowspan="3">Motor Vehicle Tonnage Tax
(60% National, 25% Local tax)
(Temporary Tax Rate: 6,300 yen per 0.5 ton-year)
(Legal Tax Rate: 2,500 yen per 0.5 ton-year)
944.8 bil. yen</td></tr>
<tr><td>Diesel-Powered Motor Vehicles</td><td>Diesel Delivery Tax (Local tax)
(Temporary Tax Rate: 32.1 yen/liter)
(Legal Tax Rate: 15.0 yen/liter)
1,298.9 bil. yen</td></tr>
<tr><td>LPG-Powered Motor Vehicles</td><td>LPG Tax (50% National, 50% Local tax)
(Legal Tax Rate: 17.5 yen/kg)
29.8 bil. yen</td></tr>
<tr><td colspan="4">Total 5,793.4 billion yen
National Tax: 3,515.9 billion yen
Local Tax: 2,341.4 billion yen</td></tr>
</table>

Exhibit 2-13 Types of Tax Revenues Earmarked for Road Improvement Special Account[17]

Tax revenues specifically collected from road users as forms of gasoline tax, light oil delivery tax, or motor vehicle excise tax are earmarked for road improvement. These revenues are managed by MLIT under Road Improvement Special Accounts (RISA) of the national treasury. It demands that road users bear the cost of road improvement by levying tax on fuel consumption, and purchase

[17] Source: MLIT, "Financial Plan," http://www.mlit.go.jp/road/road_e/finance/, January 2001

and possession of motor vehicles, based on the principle of payment by beneficiaries and causers. shows types of tax and their rates.

These tax revenues are used for general, local and toll road projects. The total earmarked tax revenue of 5.8 trillion yen comprises just 45% of total road investment of 12.9 trillion[18] in Japan. The rest of total investment is from general account and from FILP (only for toll road projects). Especially, local road projects spend significant amount of general account (68%) from local tax rather than RISA (32%). Consequently, there is very little amount of investment from RISA to toll road projects (Exhibit 2-15). In FY2000, 6.2% of total RISA (684 million yen) are invested on public corporations as equity or subsidies.

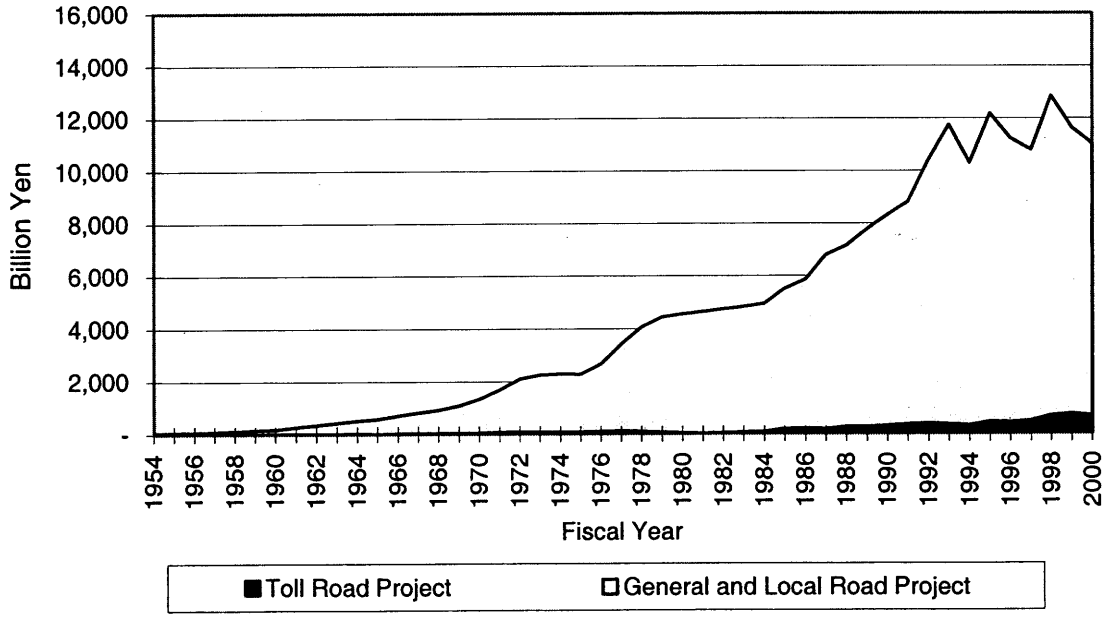


Exhibit 2-15 Usage of Road Improvement Special Account

[18] Source: MLIT, *"Doro Tokutei Zaigen ni kansuru Data-shu* (in Japanese, Data about Road Improvement Special Account)," http://www.mlit.go.jp/road/zaigen/zaigen.htm, March 2001

Exhibit 2-16 shows the international comparison of gasoline prices and taxes. Gasoline tax in Japan is relatively less compared to European countries, but much more than North American or Oceania countries.

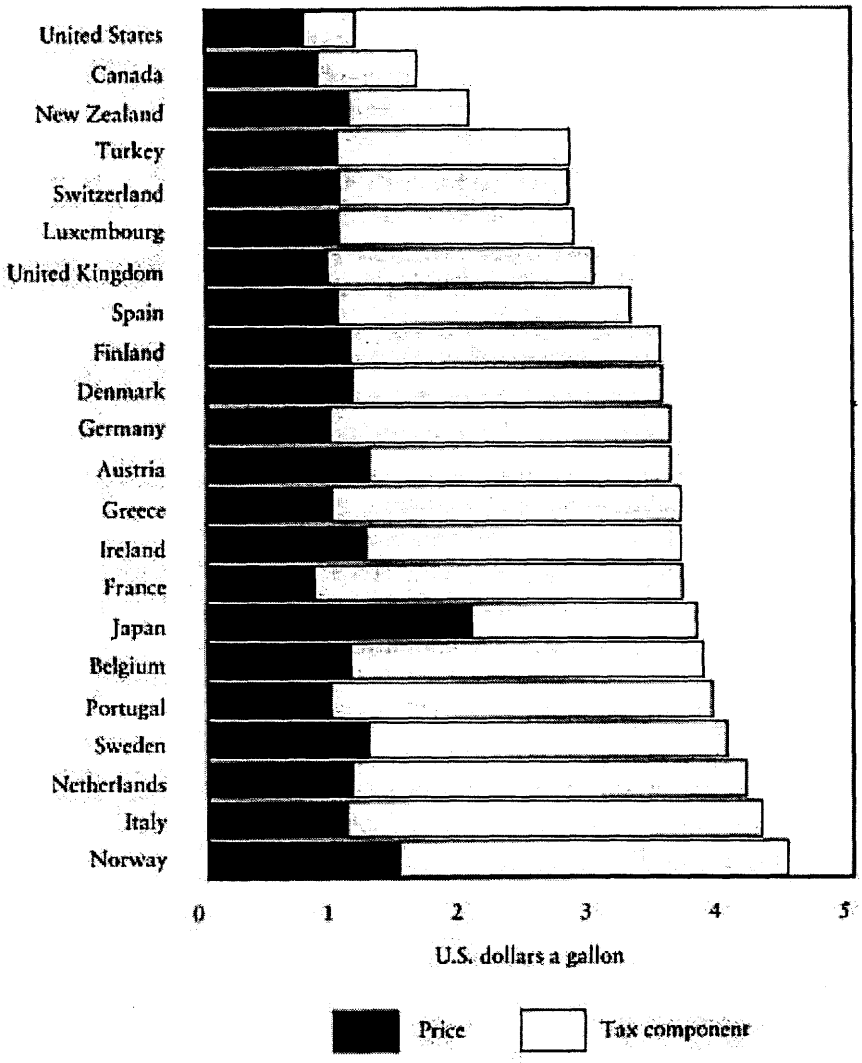


Exhibit 2-16 Gasoline Prices and Taxes in OECD Countries[19]

2.1.3.2. Toll Revenue Pooling System

Japanese Government adopted a toll revenue pooling system for the entire

[19] Source: Organization for Economic Cooperation and Development, International Energy Agency, Energy Prices and Taxes, Fourth Quarter, 1992 (Paris, 1993), pp. xxii, 291

national motorway network (for a map, see Exhibit 2-2) in 1972. The pooling system is a form of cross-subsidization. Tolls are set at an equal level for all of the routes in the network, regardless of their costs or toll revenues on the individual routes. Thus, financial viability is to be achieved for the entire network. The rationales behind this system are: (1) network can be expanded by cross-subsidizing less profitable routes with revenues from more profitable ones, (2) national motorways and urban expressways can bring the most benefits when each network is integrated, (3) financial viability of network will be improved with the opening of connecting routes, and (4) fair toll levels within the network (World Bank et al, 1999). It is generally recognized that the pooling system has contributed to expand network, especially to the construction of less profitable routes due to lower traffic demand and higher construction cost[20].

JHPC also develops stand-alone regional toll motorways (see Exhibit 2-3). These regional motorways are planned individually and do not necessarily form a part of the nationwide network. Within these regional motorways, route-by-route cost redemption has been maintained in principle. As a consequence, there are fairly large differences in the level of toll rates across routes, stemming differences in right-of-way acquisition and construction costs.

Pooling system helps to build highways in less profitable routes. However, excessive cross-subsidization creates problems for highway users of more

[20] In Japan, highway construction in rural areas tends to be difficult and expensive because of geographic mountainous condition. Most part of highways in rural areas consist of tunnels and elevated viaducts

profitable routes because they pay excessive toll to build less profitable routes where they get less benefit. To solve this problem, the Road Council suggested in 1985that cross-subsidies from the pooling system to less profitable routes should be limited to the total amount of their own toll revenue and government subsidies. Subsidies to the interest payment of less profitable roads have been increased according to this principle. (JHPC, 2001)

Urban expressways have their own pooling system as well. For example, MEPC has three pooling system basically by prefecture. An urban expressway network in each prefecture has its redemption plan with support from each local government.

2.1.3.3. Redemption of Debts

In principle, tolls are to be lifted upon completion of the redemption, and toll roads become freeways. In fact, 61 stand-alone regional motorways across the country that was operated by JHPC have been made toll-free after their redemption periods.

It has been argued however, that tolling should continue beyond the redemption period since ongoing costs for operations, maintenance, and

improvements to these roads remain, and congestion externalities will be increased[21].

Redemption Period

The redemption principle is set as a major condition for setting toll rates in Japan's toll road legislation. The toll road development costs, such as costs for construction, right of way acquisition, operation, maintenance, and financing, are to be redeemed by toll revenues over a certain period. In 1994, original 30-year redemption period for national motorway network was extended to 40 years in order to minimize toll rate increase, and since 1999, it has become 45 years. The longer redemption period becomes, the less certain financial viability becomes. However, World Bank et al (1999) argues that improved accuracy in traffic forecasting helped to rationalize this extension.

The starting date of redemption period of pooling system is determined by calculating a weighted average[22] of days between opening days of each route in the system and that of the first route of entire network. For national motorways, the opening day of first route, Meishin (Nagoya-Kobe) Expressway is July 1st 1965, and the starting date of redemption period was calculated as

[21] The Road Council, The Road Council, "*Doro Shingikai Chukan Toshin* (in Japanese, the Report for What the Future of Toll Road System Ought to Be)," November 1995

[22] The average is weighted by the cost of each route.

previous May 1995 as of December 1997[23]. Thus the end of the period was set to be December 2038, regarding average redemption period of 38 years and 7 months. In April 1999, additional routes of 1,119 km were approved for construction by the MOC, and the starting date of redemption period has shifted to January 1999 from May 1995. The revision of the length of the redemption period and the end date of redemption plan takes place in a different timing by each pooling system.

For national motorway pooling system, the redemption plan is made based on the construction cost of the routes ordered by MLIT, and it will be basically revised when construction of additional routes are ordered. The present redemption plan is for the 9,006km network of national motorway, which is authorized by MLIT in April 1999.

On the other hand, the redemption plan of urban expressways such as Metropolitan Expressway and Hanshin Expressway does not include construction cost of the routes under construction. It is included in the redemption plan on the day of the service commencement, and toll is raised at that time if necessary.

[23] Ministry of Land, Infrastructure and Transport, "*Kosoku Jidosha-do no Seko-meirei ni tsuite* (in Japanese, the Construction Order to JHPC)," http://www.mlit.go.jp/road/press/press0/12-22.htm, December 1997

2.1.3.4. Toll Rate

The toll rate is decided based on two principles: (1) toll revenues should cover the construction costs, operation costs, and interest payment for entire network of national motorways or each route of regional motorways during redemption period, and (2) tolls should not exceed the value of the benefit received by users, and required to be fair and reasonable compared with other means of transportation and various social and economic factors. For example, Exhibit 2-17 shows the difference in transportation cost from Tokyo to Osaka among several transportation methods, and highway toll is set to be fair compared with other transportation costs.

Transportation Method	Route	Transportation Cost (yen)	Cost / Person (yen pp.)	Travel Time
Highway	Tomei and Meishin Motorways Tokyo IC - Suita IC (514.6km)	14,450 (Toll 10,650 +Fuel 3,900*)	9,630**	6 hours 25 minutes***
Railway	Shinkansen Tokyo Sta. - Shin-osaka Sta.	13,750	13,750	2 hours 55 minutes
Airplane	Haneda Airport – Itami Airport	18,500	18,500	1 hour

* Fuel consumption is 13.2km/litter (MLIT) and fuel price is 100 yen/litter.
** Average passenger is 1.5 people per vehicle (Land Transportation Annual Statistical Survey 1999).
*** Average speed is 80km/h.

(As of May 2001)

Exhibit 2-17 Comparison of Transportation Costs from Tokyo to Osaka among Different Modes[24]

Toll rates are to be raised when redemption plan of each pooling system is revised (see 2.1.3.3). However, the toll will not be raised if the end of redemption period is extended within five years after its revision. Exhibit 2-18 shows how

[24] Source: JHPC, Highway Report 2000

often the toll was raised after the implementation of pooling system to national motorways.

Date	Length of Route for Redemption	Toll Rate (Normal Vehicle)	Increase Rate
Oct. 1972 Implementation of Pooling System	3,895km	8.0 yen/km × (distance)	-
Apr. 1975	4,816km	13.0 yen/km × (distance) +100 yen	66.5%
Aug. 1979	5,415km	16.6 yen/km × (distance) +100 yen	24.6%
Jun. 1982	5,415km	19.6 yen/km × (distance) +100 yen	15.1%
Oct. 1985	5,777km	21.7 yen/km × (distance) +100 yen	9.8%
Jun. 1989	6,410km	23.0 yen/km × (distance) +150 yen	8.9%
Apr. 1995	7,887km	24.6 yen/km × (distance) +150 yen	7.2%

Exhibit 2-18 Toll Raise Schedule of National Motorways[25]

In national motorways and regional motorways, there are five categories for toll by size of vehicles: light vehicles, normal-sized vehicles, middle-sized vehicles, large-sized vehicles such as trucks, and super-large-sized vehicles such as trailers. The ratios of toll rate compared with normal-sized vehicles are 0.8, 1.0, 1.2, 1.65, and 2.75 respectively. In urban expressways such as Metropolitan Expressway, there are just two categories: normal-sized vehicles and large-sized vehicles. Toll for large-sized vehicles is as twice as much as that of normal-sized vehicles.

[25] Source: JHPC, Highway Report 2000

As from April 10th 1995, toll rate for normal-sized vehicles in national motorways is 24.6 yen per kilometer plus 150 yen for the charge of using a terminal (Exhibit 2-18). This is quite expensive compared with toll rates in other countries such as France and Italy (Exhibit 2-19). According to JHPC[26], there are three reasons: (1) Japan is more mountainous than other countries, (2) highways were later developed (Exhibit 2-20), and (3) the structures have to be more rigid to prevent earthquakes in Japan.

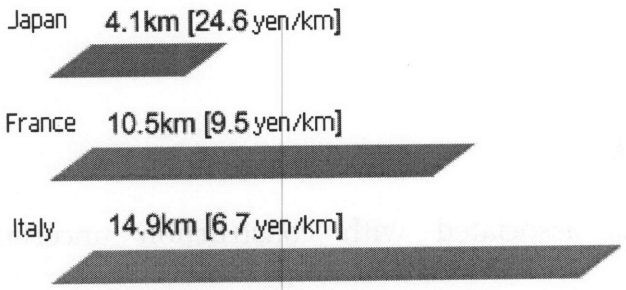


Exhibit 2-19 Travel Distance Equivalent to Tall Rate of 100 yen[27]

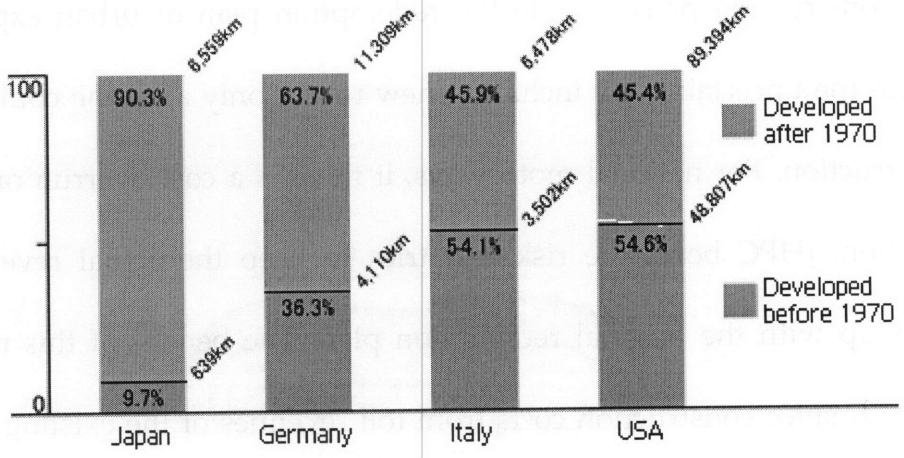


Exhibit 2-20 International Comparison of the Period of Highway Development

[26] Japan Highway Public Corporation, "*Ryokin ya Hutan no Kangaekata* (in Japanese, The Concept of Toll Rates and Allotment)," http://www.jhnet.go.jp/faq/faq00b.html, April 2002
[27] Source: JHPC, http://www.jhnet.go.jp/faq/qa_toll/06.html, 2000

2.1.4. Risk Management

The development and financing system makes the government bear most of the project risks. There are several risks associated with highway projects: (1) construction cost overrun risk and risk of construction delay, (2) financial risk such as increase in interest rates, (3) traffic projection risk, (4) inflation risk, and (5) political risk.

Construction Risk

First, risks associated with construction uncertainty are managed differently in national motorways and urban expressways. For national motorways, the redemption plan including new routes is made with uncertainty in their construction phase, while the redemption plan of urban expressways eliminates the uncertainty by including new routes only after the completion of the construction. For national motorways, if there is a cost overrun or delay in construction, JHPC bears the risk and tries to keep the actual revenues and expenses up with the original redemption plan. The benefit of this method is JHPC can finance construction costs from toll revenues of the existing routes in the same pooling system before opening. On the other hand, for urban expressways, MEPC and HEPC have to pay extra financing costs for the trade-off of eliminating construction risk because the public corporations cannot finance

the cost of new routes from toll revenues of the existing routes until they are open to traffic.

Financing Risk

Financing risks from an increase in interest rate are borne by the government. Especially for unprofitable routes in national motorways, the national government subsidizes interest if the interest rate becomes more than 3% (see Chapter 2.1.3.1). This system decrease the incentive to get finance from the source of possible lowest financing costs. Therefore, the amount of debt issuance is insensitive to the interest rate.

Traffic Projection Risk

The uncertainty of traffic projection has a big impact on toll revenues and the redemption plan. For example, the redemption plan of Honshu Shikoku Bridges has been severely affected by their low toll revenues from the traffic much less than what was projected (see 5.1.1). If HSBA goes into default, its equity holders, the national and local governments bear the risk as a consequence. Therefore, it can be said that the risk is borne by the government.

Tokyo Bay Aqua Line is another example. This 15.1km regional motorway connects Kawasaki city, an industrial area placed in between Tokyo and Yokohama, and Kisarazu city, the other side of the Tokyo Bay (Exhibit 2-21). The

construction cost was 1.44 trillion yen (US$ 11.1 billion[28]) including interests during construction period, and the toll rate was 4,900 yen (US$ 37.70) when it opened to traffic in December 1997. The traffic projection was too high (25,000 vehicles per day, but the actual traffic volume is 10,000 vehicle per day[29]) for this project, and the debt payments would soon go into default with this project alone. Therefore, the government made a special law to create a new pooling system with two other profitable regional motorways with the redemption period of 50 years, and the toll rate has been reduced to 3,000 yen (US$ 23.10) since 2000. Thus, the risk was transferred from the equity holders to the highway users of the profitable regional motorways.

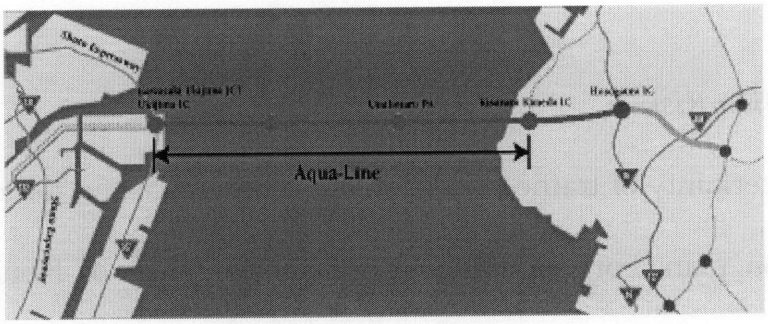


Exhibit 2-21 Tokyo Bay Aqua Line

Inflation Risk

Inflation risk is borne in two ways. First, the debt holders bear inflation risk in the short run as short as the maturity of debt, since the interest rate of

---

[28] US$ 1 = 130 yen

[29] The average volume between December 1997 and October 1999)
Source: JHPC, "*Tokyo-wan Aqua Line Jigyo Jigo Hyoka Chukan Hokoku,* (in Japanese, the Report about the Evaluation of Tokyo Bay Aqua Line Project)," http://www.jhnet.go.jp/about/act/proj/report/03.html, December 1999

debts are mostly fixed. Second, the inflation risk in the term as long as the redemption period, is not taken into account in the redemption explicitly because it is considered implicitly by revising the redemption plan every five years or so. With frequent revision adding new routes into redemption plan, most of the risk can be eliminated. Therefore, there is no need for serious risk management.

Political Risk

However, there is one risk cannot be managed by frequent revision of redemption plan: the political risk. The political risk is very high in rural areas, where politicians take advantage of highway development as a method to return benefits to people in their own electoral districts. There is a type of politicians who are especially benefited from local road investment, and they are called *political tribes*. The risk that the public corporations bear is to accept to develop several unprofitable routes requested by politicians. There is no democratic method to prevent this risk after the proposed plan is set into the Law for Construction of Arterial Motorways for National Land Development (see Chapter 2.1.2). Also, the highway development system by itself is designed to have a strong political influence from the politicians through the National Motorway Council.

2.2. Financial Analysis

2.2.1. Financial Statement

Special Accounting Treatment

The official annual financial statements of four highway public corporations are based on particular laws[30] and regulations. The applied accounting principles are in accordance with generally accepted accounting practices in Japan for the most part. However, since the public corporations are non-profit organization and their toll roads will be freeway after redemption period, special accounting treatment is applied as follows:

(1) Reserves for recoupment instead of net income

(2) Disposition of the book value of highways instead of depreciation

First, a surplus, which comes from total revenues minus total expenses, is provided cumulatively to a liability called *reserves for recoupment* instead of being treated as a profit. This is because the objective of the toll road business of highway public corporations is to recoup the costs of construction, maintenance, and operation, not to make a profit (JHPC, Annual Report 2001). Therefore, the performance shown on the balance sheet can be characterized as the progress towards recoupment of the construction costs during the relevant accounting period.

[30] The Japan Highway Public Corporation Law, the Metropolitan Expressway Public Corporation Law, the Hanshin Expressway Public Corporation Law, and the Honshu Shikoku Bridge Authority Law

As is mentioned in 2.1.3.2, there are two different recoupment systems in highways: (a) pooling system such as national motorways or urban expressways, and (b) independent recoupment system such as regional motorways. The pooling system enables the *reserves for recoupment* to be used for recouping the cost of entire network. On the other hand, each regional motorway is operated and accounted for its own recoupment plan independently. Only for the purpose of the financial statement, total surpluses of the profitable regional motorways are aggregated with total deficits of non-profitable regional motorways. The final balance of total surpluses is expensed as *provision to reserves for recoupment for regional motorways* in the income statement, and accumulated in the account of *reserves for recoupment.* This reserve is registered as liabilities on the balance sheet.

Second, road assets of highway public corporations are not depreciated but will be disposed at once when the redemption of construction costs is completed. This is because national motorways of JHPC, and urban expressways of MEPC and HEPC will all become toll-free upon full recoupment of the costs of each network. Therefore, year-by-year depreciation of road assets has not been considered applicable to the highway public corporations, and road assets shown in the balance sheet are cumulative value of all the assets invested. This method has been implemented since 1987.

As for regional motorways, each motorway becomes toll-free either upon completion of recoupment of invested funds or upon the lapse of 30 years (of some motorways, more than 30 years) after operation has started, whichever is

earlier. The book value of a regional motorway that becomes toll-free is deducted from assets, and only the amount of reserves accumulated for that motorway is deducted from the amount of *reserves for recoupment for regional motorways*. In case the amount of such reserve is less than the account of the book value of that motorway, such deficit is offset against the *allowance for losses on regional motorway operation*. This is set up for the purpose of compensating a deficit of a particular regional motorway by profitable ones only when such regional motorway becomes toll-free. The *allowance for losses on regional motorway operation* is accumulated with 15% or 20% of total revenues from each regional motorway as an expense in the income statement each year. The accumulated amount of such provision is accounted for as *allowance for losses on regional motorway operation* in liabilities of the balance sheet.

Balance Sheets

Assets	1999	2000	2001
			in ¥ million
Current assets:			
Cash and Deposits	59,131	54,956	57,893
Advance payments on construction for others	43,876	61,097	80,112
Others	10,494	5,868	10,867
	113,502	121,922	148,873
Fixed assets:			
Business assets: [b]			
Motorways	31,117,028	32,283,987	33,958,132
(National motorways)	(26,381,668)	(27,529,812)	(29,112,659)
(Regional motorways)	(4,735,359)	(4,754,174)	(4,845,473)
Others	8,708	8,589	8,421
	31,125,737	32,292,576	33,966,554
Business assets, construction in progress: [2]			
Motorways, construction in progress	3,824,250	4,422,891	4,565,382
(National motorways)	(3,301,166)	(3,825,367)	(3,993,905)
(Regional motorways)	(523,084)	(597,524)	(571,477)
Others	0	0	0
	3,824,250	4,422,891	4,565,382
Tangible fixed assets: [3]	395,017	398,681	412,359
Other fixed assets:	69,630	81,812	74,841
	35,414,636	37,195,962	39,019,138
Deferred assets:			
Discount on bonds payable	93,937	83,279	76,080
Expenses for reserch [4]	20,705	21,142	20,321
	114,642	104,421	96,402
Total	35,642,781	37,422,307	39,264,414

Liabilities and capital	1999	2000	2001
			in ¥ million
Current liabilities:			
Accounts payable	194,030	168,250	140,674
Accrued expenses	170,966	156,822	155,518
Advance receipts on construction for others	44,337	61,782	80,630
Others	1,809	2,519	15,605
	411,144	389,374	392,429
Fixed liabilities:			
Bonds [5]	22,819,075	21,957,325	21,015,179
Long-term borrowings [5]	1,370,858	2,942,204	4,648,923
Reserves [6]	77,967	79,793	78,252
Installment obligation [7]	1,193,729	1,172,716	1,143,919
Others	140,329	142,661	147,269
	25,601,961	26,294,702	27,033,544
Reserves under special laws:			
Reserve for losses on regional motorway operation [8]	279,671	299,488	333,676
Reserves for recoupment [9]	7,717,211	8,635,272	9,491,879
(National motorways)	(7,569,400)	(8,490,653)	(9,419,960)
(Regional motorways)	(147,810)	(144,619)	(71,919)
Others	0	0	0
	7,996,883	8,934,761	9,825,556
Total liabilities	34,009,989	35,618,838	37,251,529
Capital: [10]			
Government investment	1,602,725	1,772,725	1,980,095
Surplus: [11]			
Earned surplus	30,067	30,743	32,790
Surplus reserves	31,672	30,067	30,743
Profit(Loss) during the year	Δ 1,605	676	2,046
	30,067	30,743	32,790
Total capital	1,632,792	1,803,468	2,012,885
Total	35,642,781	37,422,307	39,264,414

As of March 31st

Exhibit 2-22 Balance Sheet of JHPC[31]

Exhibit 2-22 is a balance sheet of JHPC. Each item on assets, liabilities and equity is explained as follows:

(1) Assets

- *Business assets* consist of the aggregate construction costs of motorways in operation (*motorways*), and the assets of car parking and other business facilities ancillary to motorways currently in service (*others*). As is mentioned before, highway assets are not depreciated in the balance sheet,

[31] Source: JHPC, Annual Report 2001

while the other assets are depreciated. This is because the other assets will not become toll-free after recoupment of the construction costs, and their revenues are regarded as surplus and excluded from the source for the *reserve for recoupment*.

- *Business assets, construction in progress* represent the temporary pooling of all the amounts being invested for highway construction, out of which amounts corresponding to the costs for the completed motorways are transferred to *Business assets, Motorways* when the motorways are opened to traffic.
- *Tangible fixed assets* include office buildings, machinery and equipment, and automobiles and trucks, and are equal to the acquired costs minus depreciation.
- Expenses related to specific motorways or other business facilities are transferred from *Expenses for research* to *Business assets, construction in progress*, when the construction of these motorways and facilities is commenced. Other expenses for research are depreciated over five years.

(2) Liabilities and Equity

- *Fixed Liabilities* include all bonds and long-term loans with original maturities over one year (including current portion).
- *Reserves* comprise mainly reserves for retirement allowance.

- *Installment obligation* is the long-term liability payable in installment for the purchase of the facilities of Tokyo Bay Aqua Line (see 2.1.4) from the Trans-Tokyo Bay Bridge Corporation[32].
- The equity of highway public corporations (referred as *capital* in Exhibit 2-22) are provided by RISA from the government as is mentioned in 2.1.3.1, and no dividend is required.
- *Surplus* accounts for the accumulated profit or loss resulting from the business activities other than motorway operation.

Income Statement

Exhibit 2-23 is an income statement of JHPC.

- *Net profit* or *net loss*[33] represents the total revenues minus total expenses resulting from the business activities other than motorway operation (being the operation of car parking and other business facilities ancillary to motorways) during the relevant accounting period.
- *General administrative expenses* include salaries paid to employees, consumption taxes, and other overhead expenses.

---

[32] The Trans-Tokyo Bay Bridge Corporation is an enterprise funded by both public and private sectors, which was in charge of construction of Tokyo Bay Aqua Line, former Trans-Tokyo Bay Highway (Matsui, 1993).

[33] Net loss for the year ended March 31st, 1999 takes into account the loss resulting from the operation of regional motorway, Kanmon Tunnel (a tunnel to connect Honshu island and Kyushu island), whose loss is attributed to the costs incurred from intensive repair works conducted during the year.

- *Depreciation expenses for business assets* represent depreciation expenses for car parking and other business facilities ancillary to motorways. They are computed using the straight-line method. Depreciation is not applied to motorways as is mentioned before.

in ¥ million

Revenues	1999	2000	2001
Operating revenues:			
Toll revenues from motorways	2,062,829	2,084,154	2,096,233
Others	11,567	31,353	12,998
	2,074,396	2,115,507	2,109,231
Revenues from construction for others:	578	576	618
Subsidies from Government: [2]	97,865	194,112	87,715
Non-operating revenues:			
Interest received	304	112	180
Miscellaneous	6,236	7,712	8,090
	6,541	7,824	8,271
Net loss for the year: [3]	1,605	—	—
Total	2,180,986	2,318,021	2,205,837

in ¥ million

Expenses	1999	2000	2001
Operating expenses for businses assets:			
Motorways	323,680	326,153	329,894
Others	1,075	1,050	1,108
	324,755	327,204	331,003
General administrative expenses:			
General administrative expenses [4]	85,434	78,448	67,628
Others	26,776	27,216	26,292
	112,211	105,664	93,921
Provision of reserves for:			
Losses on regional motorway operation [5]	34,629	35,115	36,544
Recoupment [6]	729,678	921,411	924,560
(National motorways)	(757,401)	(921,252)	(929,306)
(Regional motorways)	(△27,723)	(159)	(△4,746)
Others	742	500	500
	765,049	957,027	961,605
Depreciation expenses for business assets: [7]	178	175	176
Non-operating expenses:			
Interest on bonds	889,223	828,935	696,846
Interest of borrowed funds	27,775	35,932	62,662
Amortisation of discounts on bonds	17,817	16,797	14,820
Miscellaneous	43,975	45,607	42,753
	978,791	927,272	817,083
Net profit for the year: [3]	–	676	2,046
Total	2,180,986	2,318,021	2,205,837

As of March 31st

Exhibit 2-23 Income Statement of JHPC[34]

Evaluation of Financial Statement

The largest priority for highway public corporations is to pay back their debts. It is *reserve for recoupment* in the balance sheets that shows the factor how much the debt payment has been already accomplished, and it is *provision to reserve for recoupment* in the income statement that shows how much the debt is

[34] Source: JHPC, Annual Report 2001

paid back in that year. Exhibit 2-24 shows the ratio of *reserve for recoupment* over assets and the ratio of *provision to reserve for recoupment* over revenues of four highway public corporations.

(million Yen)	JHPC	MEPC	HEPC	HSBA
	FY2001	FY2000	FY2000	FY1999
Revenues	2,205,837	262,640	189,982	185,852
Provision to Reserve for Recoupment	961,605	71,522	14,469	271
Provision to Reserve for Recoupment / Revenues	44%	27%	8%	0.1%
Assets	39,264,414	6,825,741	4,713,625	4,009,208
Reserve for Recoupment	9,491,879	1,343,425	316,490	10,949
Reserve for Recoupment / Assets	24%	20%	7%	0.3%

Exhibit 2-24 Ratios regarding Reserve for Recoupment

The ratios of *provision to reserve for recoupment* over revenues indicate what percentage of revenue was used to debt payments in a specific fiscal year. JHPC, MEPC, HEPC, and HSBA paid back their debts with 44%, 27%, 8% and 0.1% of their revenues, respectively. Therefore, especially for HEPC and HSBA, revenues are not enough to repay their debts.

The ratio of *reserve for recoupment* over assets means that what percentage the corporation has been paid back its debts. Assets in the financial statement are the cumulative assets that the corporations have been invested since there are neither depreciation nor disposal. JHPC has already been paid back 24% of debts it has got since the foundation of the corporation, and MEPC, HEPC, and HSBA has been paid back 20%, 7%, and 0.3%, respectively. Therefore, especially for HEPC and HSBA, the debt is too much to pay back without raising their revenues.

2.2.2. Revision of Financial Statement

Criticism to the Financial Statements of Public Corporations

Since the financial statements of highway public corporations do not take depreciation and disposal into account, there is a strong argument that their data do not show real situation of companies. With the original financial statements, the financial situation of the public corporations is less obvious because the *reserve for recoupment* is the only factor to evaluate the situation.

In a viewpoint of highway public corporations, there are three reasons that they do not take depreciation into account.

First, this is because the road assets mainly consist of land (JHPC, Annual Report 2001). However, the road assets of MEPC, HEPC, and HSBA mainly consist of bridges. Therefore, this reason is not correctly stated.

Second, road assets are so properly maintained that they do not have to take depreciation or disposal into account (Kato et al, 2001). However, they have already replaced their assets such as pavements due to the decay. Therefore, the decline in the value of assets occurs even if they are properly maintained.

Finally, the reason of not considering depreciation is that road assets will be given to other organization for free in future. However, this also cannot be a reason because it is the same case as BOT projects around the world. In the financial statements of BOT projects around the world, depreciation and disposal of assets are taken into account (Exhibit 2-25).

Recently, as one of the means of government reform, the MOF set guidance[35] for all the Japanese public corporations how to make a financial statement as if they were private sectors. In this adjusted financial statement, road assets except for land should also be depreciated. Also, disposal cost should be taken into account to revise the amount of assets.

Depreciation of road assets is computed using the straight-line method. The depreciation periods are set the same as in Corporate Tax Law. In the law, depreciation periods of highways, steel bridges, concrete bridges, and tunnels are 40 years, 45 years, 60 years, and 75 years, respectively. As a result, the weighted average depreciation period of road assets is 52 years, 53 years, and 48 years for JHPC national motorways[36], MEPC [37], and HEPC[38], respectively. Assets might be depreciated below their market value (Roberts, 1988), but the depreciation method and period used in Japan are comparatively common in other BOT projects. Exhibit 2-25 shows how highway assets are amortized in several BOT projects around the world.

---

[35] Fiscal Reform Subcommittee, Ministry of Finance in Japan, "*Hokokusho – Minkan Kigyo to Doyo no Kaikei Shori niyoru Zaimu Shohyo no Sakusei to Gyosei Cost no Kaiji*, (in Japanese, The Report for Making of Financial Statement using an Accounting Method for Private Enterprises and Disclosure of Governmental Cost)," http://www.mof.go.jp/singikai/zaiseseido/siryou/zaiseic130619a.pdf, June 2001

[36] Source: JHPC, "*Nempo* (in Japanese, Annual Report) 2001"

[37] Source: MEPC, "*Gyosei Cost Keisansho* (in Japanese, the Statement of Governmental Costs) for FY2000," Press Release, http://www.mex.go.jp/press/011001/index.html, Oct. 1st 2001

[38] Source: HEPC, "*Gyosei Cost Keisansho ni tsuite* (in Japanese, the Statement of Governmental Costs) for FY2000," Press Release, http://210.155.83.178/news/kiji/pdf/cost-a.pdf, September 2001

	Depreciation calculation	Depreciation periods	Concession period
JHPC	Straight-line method	52 years for national motorways	
MEPC	Straight-line method	53 years	
HEPC	Straight-line method	48 years	
407 ETR, Toronto[39]	Straight-line method	40 years	
City Link, Melbourne[40]	Amortized on a usage basis using projected revenues, and its depreciated period is 40 years	Amortized over the estimated term of the Crown Lease granted to the Transurban City Link Unit Trust (currently 33 years and 6 months), or the assets estimated useful lives, whichever is less.	Currently 33 years and 6 months

Exhibit 2-25 International Comparison of Depreciation of Highway Assets

Revised Financial Statement

Exhibit 2-26 shows the difference between the original financial statements and the revised ones. As a result, the balance sheet and the income statement of highway public corporations are as follows with the same condition as that of private sectors[41] (Exhibit 2-27 and Exhibit 2-28):

[39] Source: 407 International Inc., Consolidated Financial Statements, Jan. 18th 2002
[40] Transurban City Link is a 22km toll road in Melbourne, Australia. Source: Transurban City Link Limited, Annual Report 2001, http://www.transurban.com.au/content/transurban/FinAR2001.pdf
[41] JHPC, "*Gyosei Cost Keisansho ni tsuite* (in Japanese, the Statement of Governmental Costs)," Press Release http://www.jhnet.go.jp/press/rel/2001/09/28/, September 2001

	Original Financial Statement	Revised Financial Statement
Fixed Assets		
Depreciation of road assets	Not considered	Depreciated in straight-line method.
Impairment of road assets	Not considered	Considered
Deferred Assets		
Research	Appropriated as *Deferred Assets*	Appropriated as *Fixed Assets, Construction in Progress*
Transaction cost of bond issuance	Amortized in straight-line method during maturity (10 years)	Amortized in straight-line method for 3 years according to Commercial Law
Collateral Account		
Collateral account	Appropriated as liabilities	Appropriated as an income as road assets are depreciated
Reserves		
Allowance for Doubtful Debts	Not considered	Appropriated as an expense
Reserves for Bonus Payments	Not considered	Appropriated the portion for this FY of estimated bonus payments
Reserves for Pension Expenses	Not considered	Considered
Reserves for Recoupment	Appropriated as liabilities	Considered to be included in net income
Reserves for losses on motorway operation	Appropriated as liabilities	Considered to be included in net income

Exhibit 2-26 Difference between the Original and Revised Financial Statement[42]

[42] HEPC, "*Gyosei Cost Keisansho ni tsuite* (in Japanese, the Statement of Governmental Costs) for FY2000," Press Release, http://210.155.83.178/news/kiji/pdf/cost-a.pdf, September 2001

Assets	FY2000	Liabilities	FY2000
Current assets	148,834	Current liabilities	382,003
Cash and deposits	57,894	Account payable	140,675
Inventory	3,422	Accrued expenses	155,518
Advanced Payments on Construction for Others	80,113	Advanced payment on construction for others	80,631
Account Receivable	7,402	Deposit received	452
Other Current Assets	3	Other current liabilities	2,088
		Reserves for bonus payments	2,639
Fixed Assets	33,220,724		
Business Assets	32,807,987	Fixed liabilities	27,028,935
Motorways	28,200,519	Road Bonds	21,015,179
Parking Lots	692	Long-term Loans	4,648,924
Other business facilities	1,847	Installment Payable	1,143,920
National motorway related facility	5,883	Reserves	104,117
Construction in Progress	4,599,046	Reserves for retirement benefits	76,363
Road construction in progress	4,599,046	Reserves for special repair	1,890
Tangible Fixed Assets	412,360	Reserves for pention expenses	25,865
Buildings	230,680	Subletting Loan	458
Structures	2,304	Collateral Accounts	116,016
Machineries	87,222	Other Fixed Liabilities	321
Vehicles	21,414		
Equipments, appliances	2,667	Total Liabilities	27,410,938
Lands	64,470		
Construction in progress	2,540	Equity	1,980,095
Other tangible fixed assets	1,062	Government Investments	1,980,095
Intangible Fixed Assets	377	Retained Earnings	4,128,882
		Equity surplus	17,597
Investment and Other Assets	74,276	Profit surplus	4,111,285
Deferred Assets	76,081	Depreciation reserves	3,744,856
Discount on bonds	76,081	Reserves for Losses on Motorway Operation	333,677
		Surplus Reserves	30,714
		Net Profit	2,038
		Total Equity	6,108,977
Total Assets	33,519,915	Total Liabilities and Equity	33,519,915

Exhibit 2-27 Balance Sheet of JHPC in the condition of Private Sectors

Revenues	FY2000	Expenses	FY2000
Ordinary Revenues		Ordinary Expenses	
Business revenues	2,109,232	Operating costs of business assets	331,004
Toll revenue	2,096,233	Motorways	329,895
Revenue from parking lots	801	Parking lots	562
Revenue from other business facilities	1,765	Other business facilities	462
Revenue from national motorway related facilities	319	National motorway related facilities	85
Miscellaneous business revenues	10,114	General administration costs	98,459
Revenue from construction for others	618	General administration costs	67,582
Revenue from road construction for others	544	Reserves for retirement benefits	5,635
Revenue from other commissioned works	74	Reserves for bonus payments	1,137
Government subsidies	100,781	Depreciation	24,105
Collateral accounts	2,174	Allowance transferred	538
Non-operating revenue	8,271	Allowance for special repair transferred	500
Interest received	181	Allowance for doubtful debts	37
Miscellaneous revenues	8,091	Depreciation of business assets	457,701
Total ordinary revenues	2,221,076	Depreciation of roads	457,525
		Depreciation of parking lots	76
Ordinary net profit	519,722	Depreciation of other business facilities	100
		Depreciation of national motorway related facilities	1
Special Losses	96,727	Non-operating expenses	813,652
Loss of turning to freeways	55,437	Bond interest	694,610
Loss by taking road assets out	41,290	Loan interest	62,599
		Interest on installment payable	35,597
		Amortisation of discounts on bonds	14,776
		Bonds issuance expenses	879
		Research depreciation	-
		Miscellaneous losses	5,192
Net Profit	422,995	Total Ordinary Expenses	1,701,354

Exhibit 2-28 Income Statement of JHPC in the condition of Private Sectors

Analysis of Revised Financial Statement

		Assets	Liabilities	Revenues	Net Income
JHPC	FY2000	33,519,915	27,410,938	2,221,076	422,995
MEPC	FY2000	5,884,795	4,889,960	263,985	-8,130
HEPC	FY2000	4,004,126	3,816,996	191,148	-419,194
HSBA	FY2000	3,597,449	4,220,409	99,955	-130,686

Exhibit 2-29 Summary of Revised Financial Statements[43]

Revised financial statements can show the reality of the financial situation of four highway public corporations by considering depreciation. Depreciation can include management responsibility for utilizing investments on properties efficiently. Net income of MEPC, HEPC, and HSBA is negative, and it turned out to be much worse than what is expected from the original financial statements.

The revised financial statements enabled us to make a comparison among other infrastructure related companies. Exhibit 2-30 shows a comparison of leverage ratios such as *liability over assets*, *revenues over liabilities*, and *net income over liabilities* between four highway public corporations and Japan National Railways (JNR). JNR has been privatized due to its huge deficit since 1987 (see Chapter 4.1). In 1964, JNR went into single-year deficit, and in 1971, it went into pre-depreciation deficit.

---

[43] Source: JHPC, "*Gyosei Cost Keisansho ni tsuite* (in Japanese, the Statement of Governmental Costs)," Press Release http://www.jhnet.go.jp/press/rel/2001/09/28/, September 2001MEPC, "*Gyosei Cost Keisansho* (in Japanese, the Statement of Governmental Costs) for FY2000," Press Release, http://www.mex.go.jp/press/011001/index.html, Oct. 1st 2001, HEPC, "*Gyosei Cost Keisansho ni tsuite* (in Japanese, the Statement of Governmental Costs) for FY2000," Press Release, http://210.155.83.178/news/kiji/pdf/cost-a.pdf, September 2001, and HSBA, "*Honshu Shikoku Renrakukyo Kodan no Gyosei Cost Keisansho ni tsuite* (in Japanese, the Statement of Governmental Costs of HSBA) for FY2000," Press Release, http://www.hsba.go.jp/h12gyo-cst/index.htm, September 2001

		Liabilities /Assets	Revenues /Liabilities	Net Income /Liabilities	Liabilities	Revenues	Net Income
					(million yen)		
JHPC	FY2000	81.8%	8.1%	1.5%	27,410,938	2,221,076	422,995
MEPC	FY2000	83.1%	5.4%	-0.2%	4,889,960	263,985	-8,130
HEPC	FY2000	95.3%	5.0%	-11.0%	3,816,996	191,148	-419,194
HSBA	FY2000	117.3%	2.4%	-3.1%	4,220,409	99,955	-130,686
JNR	FY1963		82.5%	8.3%	689,000	568,700	57,400
	FY1964		72.2%	-3.6%	831,300	600,200	-30,000
	FY1971		25.7%	-1.9%	3,087,100	793,900	-60,100
	FY1986		14.4%	-5.4%	25,065,200	3,605,100	-1,361,000

Exhibit 2-30 Comparison of Leverage Ratios[44]

According to the table, the financial situation of four highway public corporations is much worse than JNR at the time of privatization in terms of the relative amount of profits compared to its liabilities. Therefore, it is necessary to consider privatization of highway public corporations as a means of financial reform, which was the case of JNR privatization.

[44] JHPC, MEPC, HEPC, and HSBA, 2001, and East Japan Railway Culture Foundation, "The Privatization of Railways in Japan – An Outline of Splitting up and Privatizing the Japanese National Railways," 1995.

Chapter 3. The Privatization of Public Sectors

3.1. Analysis of Public Sectors

3.1.1. Objectives of Public Sectors

There are several objectives and roles of public sectors.

First, public sectors are considered to play a role to secure efficient outcomes when there is a failure of private market. Market failure occurs in several cases: for example, (1) when the services are non-excludable such as military and police services, (2) when the market does not take externalities into account such as environmental protection, and (3) when a natural monopolist is possible to emerge such as transportation, power and water supply, and telecommunications. Nationalization has been preferred as a mode of intervention against market failure in spite of other forms of correcting market failure such as regulation, taxes or subsidies. (Hemming and Mansoor, 1988)

Second, public sectors are essential when investment are not attractive enough to the private investors in terms of riskiness, or when the scale of investment is too huge for private sectors to invest. (Hemming and Mansoor, 1988)

Third, public sectors are expected to attain some social policy objectives such as employment creation or stimulating economy. In this case, public ownership has been advocated as a political strategy. (Hemming and Mansoor, 1988)

3.1.2. Efficiency of Public Sectors

According to Borchrding et al (1982), public sectors are less efficient than private sectors. In terms of the cost producing similar outputs, the private sector outperforms the public sector.

There are three reasons. First, political or government interference influences the efficiency of the public sectors. Government controls the public sectors in terms of statutory and administrative needs. When there is a market failure or monopoly, it is likely to be desirable for government to regulate or subsidize the enterprises. For example, subsidies from profit-making activities such as in urban area to loss-making ones such as in rural area are common from the viewpoint of fairness. Moreover, politicians' controls over public sectors may be well beyond the necessity for their economic, financial and social objectives. When there are multiple objectives such as social obligations and essential services for public sectors, the efficiency should be traded-off with these objectives (Hemming and Mansoor, 1988). This is often the case when there is a large externality in the market such as environment issues, or fairness between urban and rural area.

Second, bureaucratic failure is another source of inefficiency. Public sector managers are less motivated because government fails to provide incentives to achieve greater efficiency. The interferences from government and politics will limit the range of management in pubic sectors, and management will lose its autonomy. As a result, public managers will perform only to the level of necessity to meet the performance standards. These standards will be maximizing budget (Hemming and Mansoor, 1988), or maximizing their personal agenda such as redistribution to favored interest groups, securing more pay and employment (Vickers and Yarrow, 1991), in addition to maximizing social welfare. These performance standards set by bureaucrats do not align with the objectives to improve efficiency and thus to maximize profit, and the standards can become an objective in itself.

Third, public sectors do not have a financial discipline such as imposed on the private sectors. The discipline comes from the risk of bankruptcy and from the effort of borrowing on the private capital market. In capital market, however, shareholders will monitor managerial performance via share prices (Vickers and Yarrow, 1991). Public sectors do not have to borrow from the private capital market. If they should, they still have guarantees from government, or are favorably treated than private sectors (Hemming and Mansoor, 1988). There is little incentive to monitor managerial behavior of public sectors.

3.2. Denationalization

3.2.1. Definition of Denationalization

Denationalization is one of the forms of the privatization. It involves the sale of government assets to private sectors. The government can sell assets or enterprises to private individuals, private companies, or the public with an equity issue (Liddle, 1993).

3.2.2. Characteristics of Denationalization

There are two types of denationalization: (1) denationalization of competitive firms operating in a competitive market free of market failure, and (2) denationalization of monopolies with substantial market power (Vickers and Yarrow, 1991).

Denationalization of Competitive Firm

Denationalization of competitive firms can result in improvement of both allocative efficiency and productive efficiency[45] of the enterprises. Competition enhances improvement in allocative efficiency for the enterprise to survive in a competitive market. In competitive market, maximizing profit and achieving social welfare objectives are closely aligned since the externality is small.

[45] There are two types of efficiency: (1) allocative efficiency and (2) productive efficiency. Allocative efficiency is efficiency that comes from competitive environment, and productive efficiency is efficiency that comes from internal organizational issues. (Hemming and Mansoor, 1988)

Denationalization of Monopolized Firm

On the other hand, in a market dominated by a monopolist, competition is limited. Denationalization of monopoly can only result in improvement of productive efficiency, and does not result in allocative efficiency improvement since there is no competition. Allocative efficiency will not be improved just by the change of ownership after denationalization. (Hemming and Mansoor, 1988)

To improve both allocative and productive efficiencies in this case, enhancement of competition should be introduced for competitive environment before denationalization. It is important to distinguish between natural monopolies and "artificial" monopolies. Natural monopoly appears when a network is essential for the system such as electricity grid or highways, and monopoly is "artificial" when competition could exist, but dissatisfied by anticompetitive policies (Vickers and Yarrow, 1991, p.112). In "artificial" monopoly, liberalization or deregulation should be introduced to break the monopolistic situation and enhance competition. Donahue (1989) argues that they would produce more benefits than privatization of monopolies since introducing competition is more beneficial than changing ownership .

In industries with natural monopoly such as water or electric utilities, the cases shows that difference in performance of the enterprises comes primarily from regulatory policy such as financial constraints, and less from the difference in ownership (Vickers and Yarrow, 1991, p.117). Competition can also make a

form of "competition by comparison" (Vickers and Yarrow, 1991, p.124). When an enterprise splits up into several enterprises regionally or by the purpose of the job, enterprises can compete each other by efficiency. This form is applied in denationalization of Japanese National Railways (JNR, see Chapter 4.1).

If competition cannot be introduced, other forms of privatization could be tried, such as contracting out or franchising (Hemming and Mansoor, 1988). However, just changing ownership of enterprises from government to private can decrease productive inefficiency of the public sector in three perspectives: it can (1) reduce governmental and political interference, (2) make managers responsible and accountable to shareholders in the capital market, and (3) change in incentive for profit earning. Autostrade S.p.A in Italy has achieved substantial increase in efficiency just by denationalization (see 4.2).

First, shift of shareholders from government to private individuals may result in decrease of interference by government or politics. Since public social objectives and private profit ones are not aligned, government intervention usually results in loss, which causes loss for shareholders, too. Therefore, intervention will be minimum to maximize effect of denationalization.

On the other hand, if a denationalized enterprise still has social objectives other than commercial ones such as employment or stimulating economical situation, efficiency is sacrificed and there is little room for improvement in efficiency. An attempt to eliminate these objectives is likely to encounter strong political opposition. In this case, contracting out some essential service to private

sectors is one of the solutions to improve efficiency rather than denationalization. (Hemming and Mansoor, 1988)

Second, shareholders have a greater incentive to monitor performance because of the threat of bankruptcy or change in share prices (Vickers and Yarrow, 1991). This incentive to monitor the enterprises is much larger than general public who are generally expected to monitor government through election. This is because shareholders can obtain information about current and future profitability through share price and can easily recognize their benefit or loss.

Third, managers have to ensure shareholders' profit, and this is an incentive for efficiency. This can be also applied to the denationalization in a monopolized market. Share price reflects consequences of current managerial actions for future profits (Vickers and Yarrow, 1991) and one of the ways to achieve profitability is to improve efficiency.

3.3. The Problems of Privatization

There are negative side of privatization: (1) possibility of bankruptcy, (2) lack of incentive to operate unprofitable routes, and (3) difficulty in internalizing the externality of highway development.

First, the largest difference between private and public sectors is the possibility of bankruptcy. When public sectors own and operate highway

network, the public expects that the government will bear the risk of bankruptcy. This is the case in HBSA, which owns and operates unprofitable Honshu Shikoku expressways. If HBSA is privatized, it will soon go bankrupt without government support because of its critical financial situation (see 5.1.1). In France, three of four private toll road concessionaires did not survive. Three of thirteen toll road builders in Spain were taken over by the government, and two was absorbed.

Second, private sectors have little incentive to build and operate unprofitable routes with high construction cost or low traffic volume. Therefore, socially and politically important segments will remain undone. According to Gomez-Ibañez and Meyer (1993), there are four possible solutions for filling in lost segments: (a) accepting lower levels of service, (b) relying on government ownership, (c) adopting cross subsidies from profitable routes, and (d) having the government directly subsidize private sectors of the lost routes. In any options, the contribution by the government is crucial to continue the operation of necessary unprofitable routes. Without government contribution, the existing unprofitable service will be abandoned, or private sectors might use monopoly power to raise toll rate.

For the above two problems, regulation of private sectors by public sectors plays an important role. The government should regulate the privatized enterprise not to exploit their monopoly power. The private enterprise might exploit their power by raising rates or by constraining capacity in order to

maximizing shareholders' benefit. According to Gomez-Ibañez and Meyer (1993), the exploitation can be avoided by regulatory regime or rules. He argues that private sectors need assurances that regulatory regime or rules will be relatively stable or predictable over the life of their concession, and on the other hand, the government also needs long-term assurance that the road will be operated and maintained well, and that it will be in good condition when it is turned over to the government at the end of concession period. The government can regulate private toll rates and allow them of return on investment at the same time by balancing needs of two parties. When the toll rate for unprofitable routes is set appropriately with government contribution, the risk of bankruptcy and the lack of incentive to operate unprofitable routes will be decreased. Therefore, the way to set the toll rate is very crucial for the private highway operator.

Third, the presence of significant externalities is usually a disadvantage for privatization. There are several externalities in the highway development, such as equity issues, congestion, and environmental impacts. Public sectors can ensure equity with ubiquity and universality by developing standardized highway network, and can create more value by more options even if they are infrequently used. These favorable externalities will be excluded from the highway development by private sectors. This is because capital constraint and enhancement of efficiency do not allow private sectors to develop standardized network. Also, externality such as congestion may be affected by monopoly power of private sectors that operate highway network exclusively. Without

competition, there is a little incentive to improve operating service by investing on capital. This kind of project will not be executed by private sectors when the net present value of the project is negative, while public sectors take the project when the social net present value is positive. About the environmental issues, Gomez-Ibañez and Meyer (1993, p.286) argues that private sectors have both advantages and disadvantages. The advantage is that the private sectors have more incentive to compromise the environmental issues since they are more sensitive to financial costs of delays than public sectors. On the other hand, the disadvantage is that the private sectors have to rely on bargaining to reconcile conflicting interests, and it is difficult to satisfy all the interests by mutual agreements. This difficulty may lead the private sectors to avoid or abandon controversial projects.

In this case, the public sectors have an advantage to resolve the conflicts with their established procedures and authority, and their participation may be unavoidable for the controversial projects. Privatization is clearly easier to implement where externality problems are relatively small.

Chapter 4. The Cases of Privatization (Denationalization)

4.1. Japan National Railways

Japan National Railways (JNR) used to be a state owned enterprise to operate railways in Japan. It operated 21,445km of railway network in Japan with 470,000 employees in 1970. There are several private railway companies in urban areas, but JNR monopolized a railway business for intercity connections and in rural areas. It has been privatized in April 1987 to seven private railway companies (JRs).

4.1.1. History of JNR

Before Privatization

Since Japanese transportation relied mainly on railways until the mid 1960s, JNR enjoyed a monopoly in Japanese domestic transport market. For example, Shinkansen, a bullet train, has started its operation since 1964 between Tokyo and Osaka, and it had been a great success with the fastest speed by rail at that time. However, during Japanese high economic growth period from the late 1960s, automobile and air transport grew substantially, and rail transportation was rapidly losing its predominance.

JNR failed to adapt to the change in its environment, and kept investing in new railways especially in rural areas, which are politically decided by the government. Soon JNR faced financial problems. JNR fell into deficit in FY1964, experienced a carry-over loss in FY1966, and a pre-depreciation loss in FY1971. JNR reacted by shelving liabilities and raising fares, but deficit increased steadily, carryover losses reached 15.5 trillion yen, and total debts exceeded 25 trillion yen in 1986.

There are three major causes of management failure for JNR: (1) political interferences, (2) lack of sense in competition, and (3) lack of financial discipline.

First, JNR needed approval from the Diet for important management decisions, such as budget and fares. Also, top management of JNR was appointed by the government. For example, the president of JNR was appointed by the Cabinet, and the vice-president and the members of the board required the approval of the Minister of Transport. Moreover, the biggest interference was from politicians, who tried to benefit for their own constituencies to win the favor of voters, either from the construction of new railway lines and stations or from the prevention of abandoning unprofitable railway lines. It was very difficult for JNR to refuse such pressures from politicians since the budget and the management were in the grasp of politicians. As a result of these interferences, the discretion of the management had become very limited for JNR, and the management had lost its autonomy and the sense of responsibility to manage the company.

Second, JNR was monopolized nationwide railway operation, and it did not have a sense of competition with other companies. JNR had two kinds of competition: one is in the intercity transportation market with airlines and automobiles, and the other is in the urban rail transport market with other private railway companies. Lack of the sense of competition affected the management in both competitions in terms of quality of the service, and it failed to adapt changes of the market to the management strategy.

Third, there was no financial discipline for JNR. The financing of operation was mostly from the fares collected, but the financing of new construction was mostly from the government or with the guarantee of the government. Therefore, there is no incentive to find sources with possible lower financing cost. Also, there was no monitoring from debt holders in the financial market since the government guarantees the repayment of the debts. The monitoring from the public could be only indirectly through the election of members of the Diet. Employees of JNR had an idea that "state-owned railway could not go bankrupt," since the government would foot the bill (East Japan Railway Culture Foundation, 1995).

Actually, JNR tried to restructure itself for four times since 1969, but all the restructure programs turned out to be a failure. This meant that the restructure by symptomatic treatment within the management structure of a public corporation could not succeed (East Japan Railway Culture Foundation, 1995).

4.1.2. Privatization Scheme

Due to the failure of restructuring, the government decided to privatize and to split up JNR as a means of drastic restructuring. There were four steps for the privatization of JNR: (1) splitting up, (2) restructuring debts and employees, (3) regulation changes, and (4) denationalization.

Splitting up

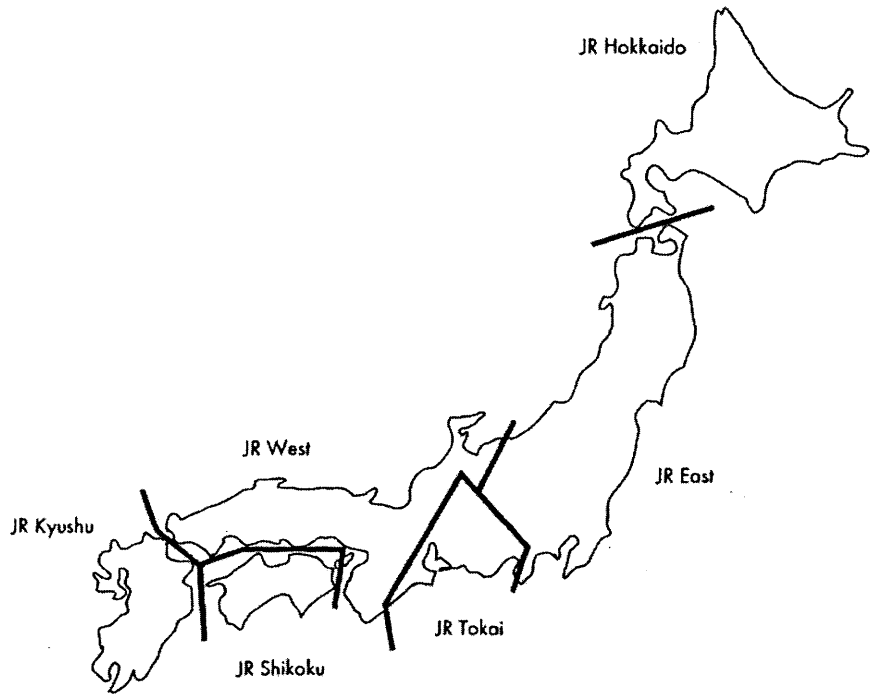


Exhibit 4-1 Splitting up of Japanese National Railways

JNR was split up into 12 private and public companies (Exhibit 4-3). First, passenger railway business was split up into six different private passenger railway companies (JRs) by region (Exhibit 4-1). Passenger railways in Hokkaido, Shikoku, and Kyushu Islands, three of four major islands in Japan, are run by the

companies in each island: JR Hokkaido, JR Shikoku, and JR Kyushu (three island JRs). Passenger railways in the Honshu Island, the largest and the busiest island in Japan, were split into three railway companies by region: JR East, JR Central, and JR West (three Honshu JRs). These six regional passenger railway companies own infrastructure such as railway tracks and stations.

Second, freight railway business for all over Japan was split up from the passenger business, and is managed by one freight company, JR Freight. JR Freight does not own infrastructure basically and operates freight service by using passenger railway tracks and paying usage fees.

Third, the state-owned Japanese National Railways Settlement Corporation (JNRSC) was created for the liquidation of JNR's historical debts. Assets and employees from JNR necessary for rail operation were taken over by seven JRs, and the rest was transferred to JNRSC. Also, JNR would cede liabilities to JRs only to the extent that would not hinder sound management in the future. Remaining liabilities would be disposed of by JNRSC, and it is in charge of the sales of idle land and shares for disposal of long-term debts. JNRSC held all the shares before the sales of shares to the public.

Fourth, the state-owned Shinkansen Holding Corporation (SHC) was created to own Shinkansen railway tracks and to lease them to the companies that operate Shinkansen, JR East, JR Central, and JR West. Here, the vertical separation of Shinkansen was achieved, but this had created managerial problems for JRs (mentioned later in this section).

Finally, Railway Communications Company, Railway Information Systems Company, and Railway Technical Research Institute were created for their own purposes.

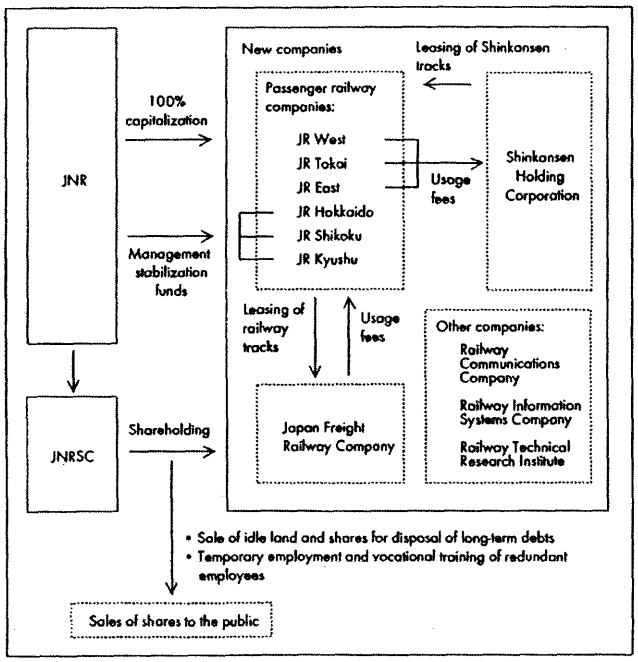


Exhibit 4-3 Outline of the JNR Restructuring[46]

Restructuring Debts and Employees

Next, the excessive debts were assigned to new companies. As is described before, each new privatized company would be assigned debts only to the extent that would not hinder sound management in the future. Three Honshu JRs and JR Freight were assigned long-term liabilities of 5.9 trillion yen, and would bear liabilities equal to replacement value of Shinkansen of 8.6 trillion yen through the fee for the usage of SHC's assets. Three island JRs had low earning power, and would not have to bear any liabilities from JNR. Moreover, they would be

[46] Source: East Japan Railway Culture Foundation, 1995

subsidized their operating losses through Management Stabilization Funds established for them. The rest of liabilities, which totaled 22.7 trillion yen, were estimated to be redeemed by the sales of new companies' stocks (1.2 trillion yen), the sales of idle lands (7.7 trillion yen), and the tax raise (13.8 trillion yen). (Exhibit 4-4)

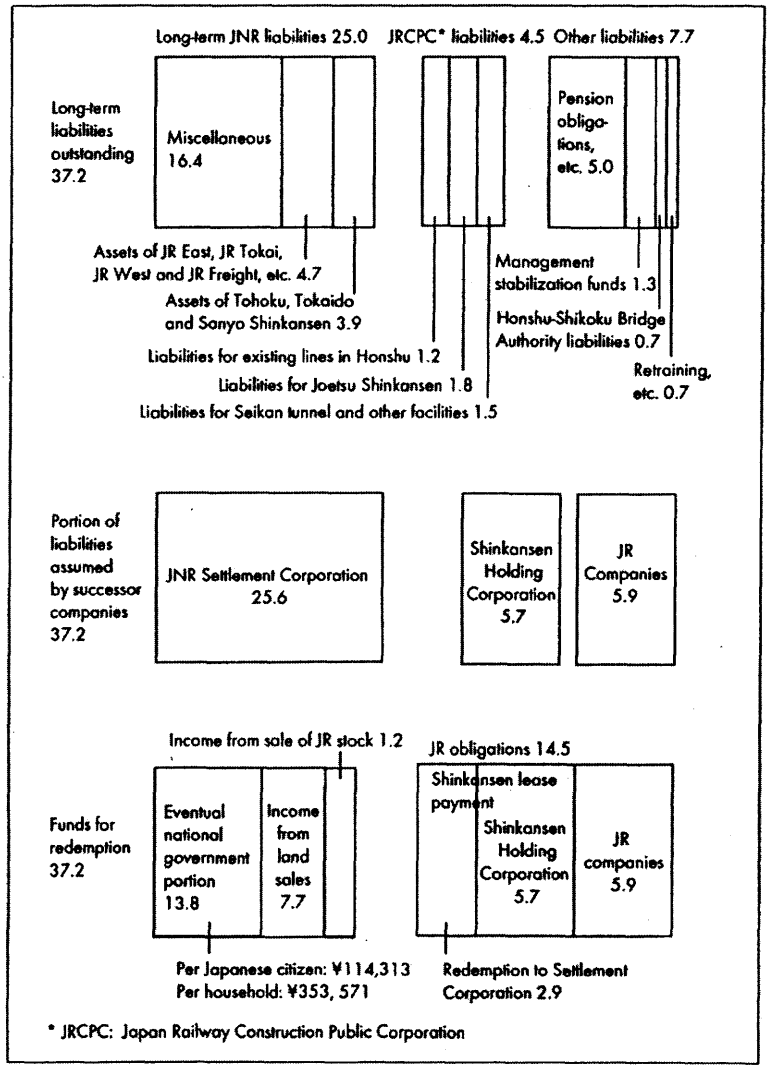


Exhibit 4-4 Disposition of JNR's Long-term Liabilities[47]

[47] Source: East Japan Railway Culture Foundation, 1995

Employees of JNR were also excessive. JNR had 277,000 employees as of April 1986, and the appropriate number of employees for new companies is estimated to be 183,000 (Fukui, 1992, p.43). As a result of restructuring, 203,100 of JNR employees were allocated to new companies, and the rest either was transferred to JNRSC, retired, or was transferred to the public and private sectors.

Regulation Changes

	JNR	JR	Private Railways
Business Fields	Limited to railway businesses	Free in principle. (New businesses require approval of the Minister of Transport*.)	Free
Investment Restrictions	Scope of investment limited by law. Each investment required approval of the Minister of Transport.	None	None
Budget Filing Procedures	Diet resolution	Approval of the business plan (Revenue and expenditure budgets must be presented as attached materials.)	None
Borrowing and Issuance of Bonds	Approval of the Minister of Transport (Limits determined by Diet resolutions)	Long-term borrowing and issue of debentures require approval of the Minister of Transport*.	No restrictions
Appointment of Executive Officers	President: appointed by the Cabinet Members of the board of auditors: appointed by the Minister of Transport Other executives: approved by Minister of Transport	Determined at a general meeting of shareholders (The appointment of representative directors and auditors requires approval of the Minister of Transport*.	Determined at a general meeting of shareholders
Salaries	Salaries determined in principle by the legal total salary system.	According to negotiations between management and labor	
Contract Methods	Open bids, in principle	Decided autonomously	
Fares	By Diet resolution in principle (Changed to the current approval system since 1997)	Approval of the Minister of Transport*	

* Minister of Land, Infrastructure and Transport since 2001

Exhibit 4-5 Changes in Regulation in Relationship with the Government[48]

[48] Source: East Japan Railway Culture Foundation, 1995

The next step is the changes in regulation that JNR used to have under law. JRs still has several requirements from the Ministry of Land, Infrastructure, and Transport compared with other private railway companies, but the regulation has been lessened compared with the period of JNR (Exhibit 4-5).

In June 2001, the government legislated the law that three Honshu JRs are exempted from the regulation referred in the table above. Therefore, Honshu JRs are now regulated to the same extent as private railway companies, and their autonomy has increased substantially.

Denationalization

The stocks were held by JNRSC after splitting up and to be sold to the public as soon as possible to ensure autonomous management. The criteria for obtaining listing on the stock exchange is as follows (Fukui, 1992): (a) net assets must be twice as large as contributed capital, (b) profits before tax must be more than 40% of contributed capital for the year before listing and more than 30% of contributed capital for two consecutive years, (c) a dividend must be paid in the immediately preceding period, and (d) the company must have been in business for at least five consecutive years. By 1992, all three Honshu JRs had satisfied the requirements to list their shares on the stock market. In October 1993, shares of JR East were listed on the stock exchanges. At this time, 2.5 of four million shares held by the JNRSC were released to the stock market. In August 1999, one million shares in addition were listed. Also, 61.4% of JR West shares and 68.3% of

JR Central shares have been listed on the stock market in October 1996 and in October 1997 respectively (Exhibit 4-7). On the other hand, three island JRs and JR Freight have not met the criteria, and their shares have not been listed on the stock market yet. It is still held by JRCC, which succeeded stocks from JNRSC in October 1998 at the time JNRSC has been dissolved.

JR Companies	Number of Shares held by JNRSC (as of 1987)	Stock Sales			Number of Shares held by JRCC (as of 2001)
		Shares Sold	Revenue w/ Stock sales (Billion yen)	Date Sold	
JR East	4.00	2.50 1.00	1075.9 652.0	1993.10 1999.8	0.50
JR Central	2.24	1.354	485.9	1997.10	0.886
JR West	2.00	1.366	487.8	1996.10	0.634
Subtotal	**8.24**	**6.22**	**2,701.6**		**2.02**
JR Hokkaido	0.18	-	-	-	0.18
JR Shikoku	0.07	-	-	-	0.07
JR Kyushu	0.32	-	-	-	0.32
JR Freight	0.38	-	-	-	0.38
Subtotal	**0.95**	**-**	**-**	**-**	**0.95**
Total	**9.19**	**6.22**	**2701.6**	**-**	**2.97**

In million shares otherwise specified

Exhibit 4-7 Sales Record of JR Stocks[49]

Purchasing Back of Shinkansen Infrastructure

There has been a major change in the scheme of privatization in October 1991, when the SHC sold Shinkansen assets to three Honshu JRs.

[49] Source: Japan Railway Construction Corporation, Japan National Railways Settlement Headquarters, "*JR Kabushiki no Shobun* (in Japanese, a Clearance of JR Stock)," http://www.jnrsh.gr.jp/kabushiki/kabushiki.html, February 2002

Assets of four Shinkansen had been transferred to SHC since 1987: Tokaido (Tokyo – Shin-Osaka), Sanyo (Shin-Osaka – Hakata, Fukuoka city), Tohoku (Tokyo – Morioka), and Joetsu (Tokyo – Niigata). Their construction costs vary widely due to the periods when they were constructed, and fare revenues vary due to differences in population along Shinkansen. To level these differences, Shinkansen tracks were held collectively by SHC, and leased to three Honshu JRs under the SHC Law. Leasing fee is set based on the replacement value and traffic volume of each Shinkansen. After the leasing period of 30 years, the ownership of Shinkansen tracks would be transferred to three Honshu JRs.

However, the law had two main shortcomings (Fukui et al, 1994): (a) the law did not provide the total transfer value of Shinkansen, nor allocation of the total value among each line or among each JR, and (b) the Honshu JRs had to pay the maintenance cost for the lines without registering depreciation for the whole assets of the Shinkansen line. Also, they could not calculate their assets and liabilities to list companies' shares to the stock exchange, because leasing fees can be changed during the leasing period and the liabilities that each company would assume will be changed (East Japan Railway Culture Foundation, 1995). These shortcomings had a major impact on JR Central's financial condition, because 84% of its revenue comes from Tokaido Shinkansen. During initial three years of its operation, the investment by JR Central amounted to 330 billion yen[50], while the company could register only 190 billion of depreciation for non-

[50] Three quarters of 330 billion yen are related to investments for Shinkansen.

Shinkansen assets. Consequently, long-term debts outstanding had increased by 36 billion yen (Fukui et al, 1994).

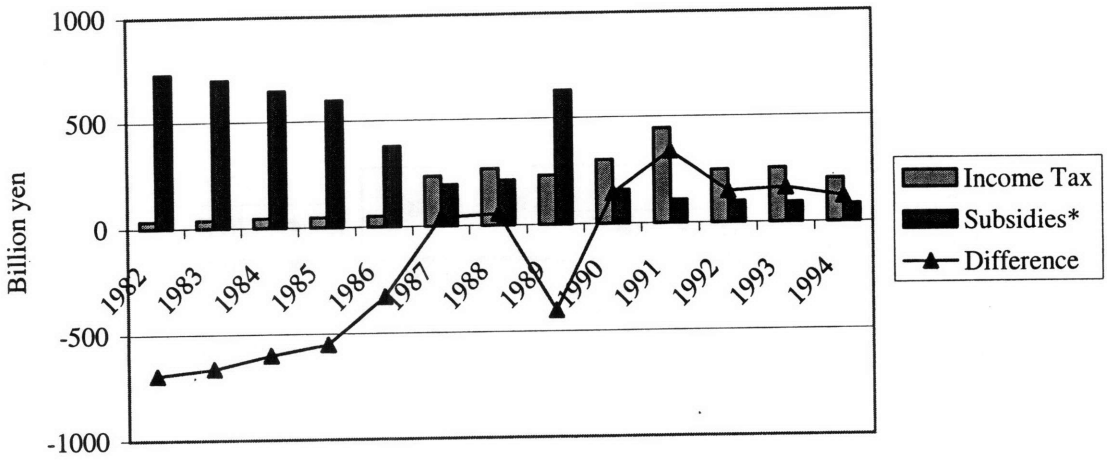
In order to resolve these problems, the government decided to transfer the Shinkansen tracks from the SHC to the three Honshu JRs in October 1991. The sale price was set at 9.2 trillion yen, 8.1 trillion yen of which is equivalent to the existing liabilities of SHC and will be repaid during 26 year period, and 1.1 trillion yen of which will be repaid during 60 year period and will be used to fund the state-owned Railway Development Fund[51] for the construction of newly planned railways, such as Nagano Shinkansen or the extension of Tohoku Shinkansen to Aomori.

4.1.3. Result of Privatization

There have been significant changes after the privatization and splitting up of JNR: (1) efficient management without interference, (2) service improvement through competition, and (3) sound management by financial discipline.

As a result of efficient management and increased revenue, the new companies have never raised their fares since the privatization for 15 years, although JNR raised fares almost every year.

[51] Railway Development Fund merged with Maritime Credit Corporation and has been called the Corporation for Advanced Transport and Technology since October 1997.



*Subsidies (1987-94) are to JNRSC, SHC and Railway Development Fund

Exhibit 4-8 Change in Tax Payment and Subsidies[52]

Also, the burden of the government has decreased since privatization in 1987. Before privatization, the government subsidized JNR to cover its deficits, but it turned out that JRs' income taxes are much higher than subsidies from the government to the state-owned corporation such as JNRSC, SHC, and Railway Development Fund created after the privatization (Exhibit 4-8). This fact shows that the privatization had a good effect on the financial situation of the government.

Management Efficiency without Interference

First, privatization has reduced interference from the government and politicians, and thus enabled management of self-responsibility. Therefore, the management of each JR is responsible enough to react to the environmental

[52] Source: Ministry of Transport

change and to make decisions rapidly. This autonomous management has had a great impact on efficiency.

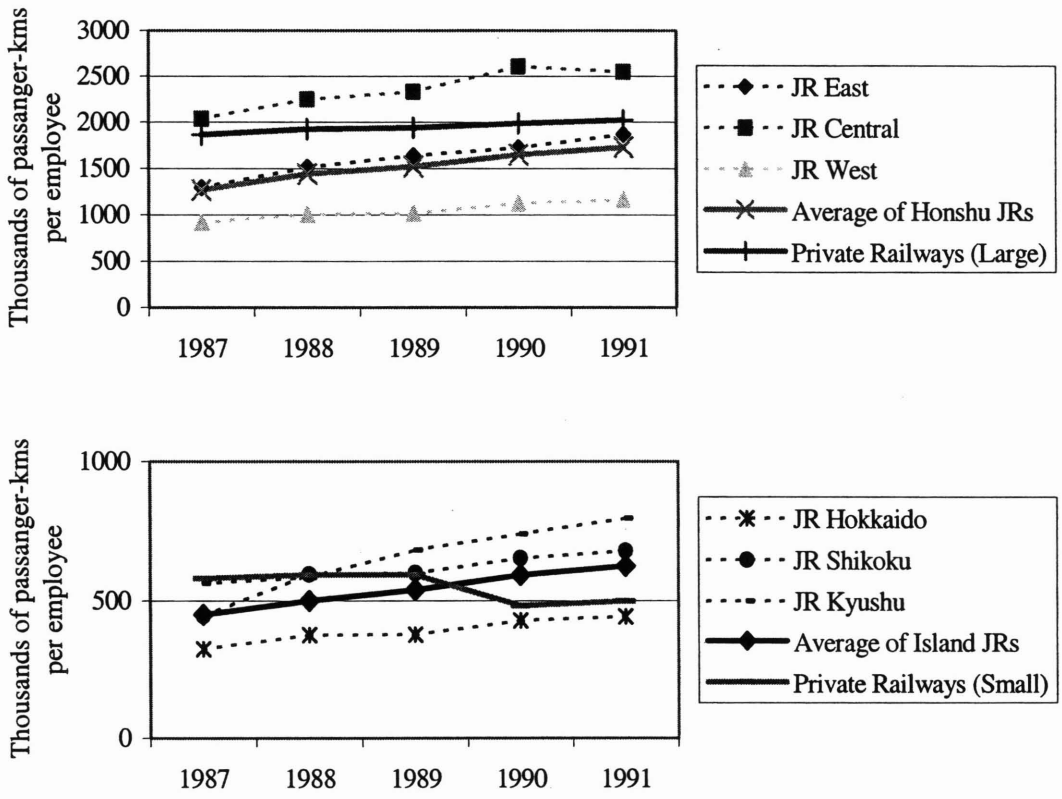


Exhibit 4-9 Labor Productivity Comparison after Privatization[53]

shows the increase of labor productivity in terms of passenger-km per employee after privatization. The productivity of Honshu JRs is approaching that of large private railway companies, and the average of Honshu JRs productivity became about 86% of large private railways. On the other hand, three island JRs has a productivity 2.8 times lower than that of Honshu JRs, but their average became close to that of less-efficient small private railway companies. The table also shows that splitting up in regional private companies has had a positive

[53] Source: Fukui et al, 1994, p.78

impact on productivity increase especially in three island JRs (Fukui et al, 1994). In spite of the disadvantage they have in terms of market size, they showed larger increase rate of 39.0% in average from 1987 to 1991, compared with 36.3% of the average increase rate of Honshu JRs.

There are still political interferences especially in construction of new Shinkansen. The government has expanded new construction of Shinkansen all over the country since August 1988 (1,398km as of December 2000). However, the whole scheme is set not to deteriorate financial situation of JRs by taking shareholders into consideration, and is legislated in 1997.

The scheme has three main points: (a) vertical separation, (b) source of funding, and (c) agreement of JR. First, Shinkansen will be constructed and owned by Japan Railway Construction Corporation[55] (JRCC), and operated by JRs. This is a vertical separation of an owner of infrastructure and an operator. JRs are going to pay usage fees to the JRCC, and the fees are set not to exceed the difference in estimated profits between Shinkansen operation and the operation of convention line parallel to Shinkansen. The rest of construction cost is borne by the government.

Second, the construction cost is funded totally by subsidies from the governments, and not by debts any more. Two thirds of the construction costs are funded by the national government including loans from Corporation for

[54] Source: Fukui et al, 1994, p.78

[55] JRCC was established in 1964, and has been engaged in construction of railway infrastructures, such as Shinkansen, urban railways, and Seikan tunnel, the longest tunnel in the world as of May 2002.

Advanced Transport and Technology (former Railway Development Fund). Before privatization, the financing used to be mostly from debts. For example, the construction cost of Joetsu Shinkansen (Tokyo – Niigata) is funded 87% by debts and 13% by national government subsidies (Exhibit 4-11).

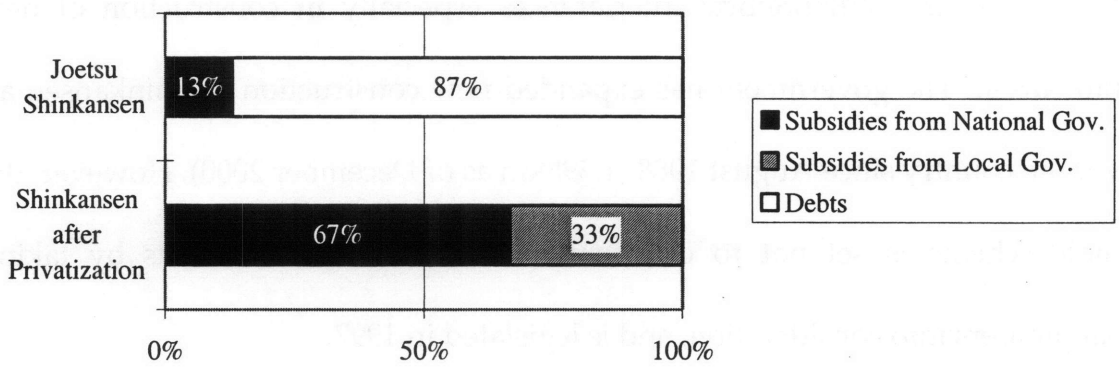


Exhibit 4-11 Source of Funding for Shinkansen[56]

Third, new Shinkansen will not be constructed without the agreement of JR to operate it. JR also has a right to discontinue the operation of convention line parallel to Shinkansen within the agreement. For example, after JR East started the operation of Nagano Shinkansen in October 1997, it discontinued existing railway service parallel to Shinkansen. Local governments and local private company created Shinano Railway Inc. and took over its ownership and operation from JR East.

[56] Source: Japan Railway Construction Corporation, "*Seibi Shinkansen no* Gaiyo, (in Japanese, the Outline of New Shinkansen Development)," http://www.jrcc.go.jp/sigoto/sigoto1.htm, January 2002

Competition

Second, the principle of competition was introduced through privatization, and the efficiency has been increased by the competition. JRs have applied four strategies (Fukui, 1992) to deal with the competition of Shinkansen mainly with air transportation, and the competition of the urban rail transportation with other private railway companies: (a) JRs adopted management strategies that their primary goal is to deliver service to their passengers. To meet the goal, management at each company has improved passenger accommodations at stations and in trains, speedups of trains, increases in frequency of train service, and improvement of employees' attitudes toward customers. (b) JRs have tried to diversify and upgrade services through the introduction of new types of vehicles, deluxe sleepers, and direct runs to tourist sites. (c) JRs have committed themselves to research and development for speeding up trains, more convenience, and safety improvement. Their developments are taken place at the Railway Technical Research Institute and financially supported by JRs. The examples of their developments are new fast vehicle models for both Shinkansen and the limited express trains for conventional lines, new automatic train control system, and the innovated pre-paid card ticket system. (d) JRs placed their top priority on trunk lines and urban areas such as Tokyo metropolitan area. They are trying to make passenger-friendly and frequent train schedules in the urban area.

As a result of these efforts combined with economic boom, passenger transport increased by an annual average of 4.5% during the five-year period following the privatization, and is considerably higher compared with the average annual increase rate of 0.6% during the four-year period before the privatization.

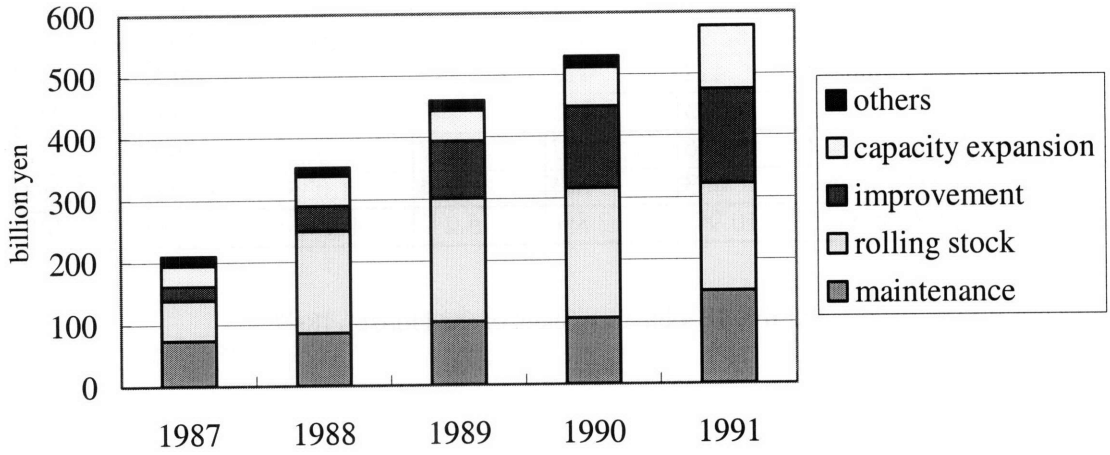
Also, "competition by comparison" (Vickers and Yarrow, 1991, p.124) is introduced by splitting up JNR into six passenger railway companies. This had an effect to foster a mutual sense of competition among railway companies (East Japan Railway Culture Foundation, 1995).

Improvement in Financial Conditions of JRs

Finally, financial situation has become sound due to the discipline in the financial market. Especially, shareholders are concerned with the companies' business and monitor the companies. Also, the government has contributed to decrease new companies' debts by taking out great portion of JNR's debts and shifting it to JNRSC.

JRs had made efforts to improve their financial condition by decrease debt portion of funding. To decrease debts, JRs have restrained their investment to the amount of internal sources of funds, that is, depreciation plus retained earnings (Fukui et al, 1994, p.24). They had invested mainly in maintenance and rolling stocks for the first four years to make up the shortfall of these investments during the final years of JNR (). Since then, they have rapidly increased their

investment in improvement of infrastructure with a long-term perspective, such as Automatic Train Stop system or Automatic Train Control system.



Note: Expenditures do not include the purchase of Shinkansen lines.

Exhibit 4-13 Capital Expenditures by JRs[57]

Thus, the ratio of equity to assets of Honshu JRs increased to 16.9% in 1990 from 10.9% in 1987, the year of privatization. However, the purchase of Shinkansen facilities in October 1991 has brought huge amount of debts into Honshu JRs, and the ratio decreased to 7.9% in 1992 (Exhibit 4-14). This is well below that of the private railways (17.3% in 1991), although the ratio for these companies relatively low compared with other industries (Fukui et al, 1994, p.73). After this, Honshu JRs has been keeping efforts to increase equity to assets ratio, and it has increased to 11.2% (JR East: 12.5%, JR Central 11.1%, JR West 8.0%) in 2001 (Exhibit 4-15).

[57] Source: Fukui et al, 1994

(billion yen)	1987	1988	1989	1990	1991	1992
Current Assets	629	543	557	675	676	669
Fixed Assets	5,433	5,286	5,334	5,446	14,636	14,566
Total Assets	**6,062**	**5,829**	**5,891**	**6,121**	**15,312**	**15,235**
Current Liabilities	1,183	1,254	1,241	1,281	1,494	1,403
Fixed Liabilities	4,216	3,831	3,756	3,805	12,695	12,629
Total Liabilities	**5,399**	**5,085**	**4,997**	**5,086**	**14,189**	**14,032**
Contributed Capital	412	412	412	412	412	412
Legal Reserve	205	205	205	205	211	215
Retained Earnings	46	127	277	418	499	576
Shareholders' Equity	**663**	**744**	**894**	**1,035**	**1,122**	**1,203**
Ratio: Equity/Assets	10.9%	12.8%	15.2%	16.9%	7.3%	7.9%

Exhibit 4-14 Balance Sheet of the Honshu JRs[58]

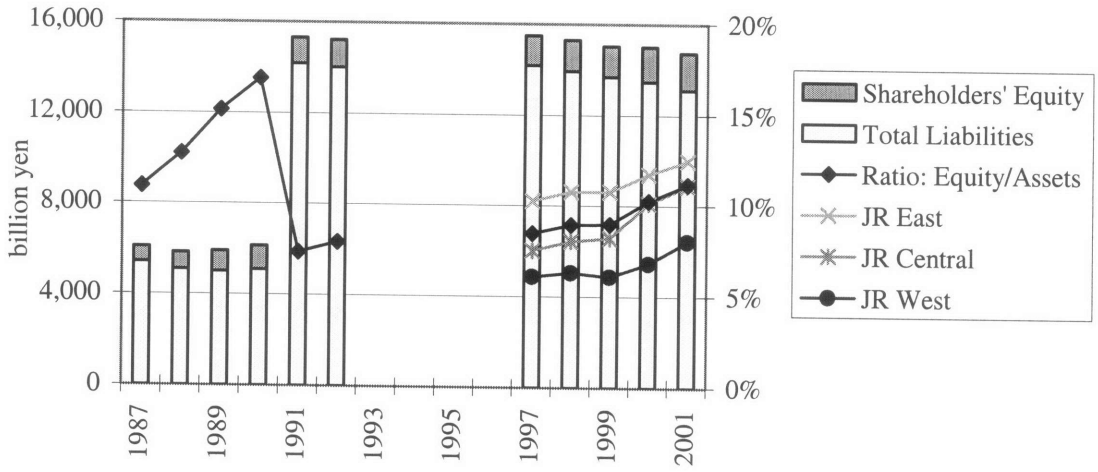


Exhibit 4-15 Ratio of Equity to Assets of Honshu JRs[59]

4.1.4. Remaining Problems

Debt Repayment of JNRSC

At the time of debt restructuring, 25.5 trillion yen of total 37.1 trillion yen debts were transferred to JNRSC in April 1987. According to the scheme at that

[58] Source: Ministry of Transport, "*Tetsudo Tokei Nempo* (in Japanese, Annual Railways Statistics)"
[59] 1987-92: Ministry of Transport, "*Tetsudo Tokei Nempo;*" 1997-2001: JR East, JR Central, and JR West, Annual Report 2001

time, 7.7 trillion yen and 1.2 trillion yen can be repaid by the sales of land and the sales of stock of JRs, respectively. However, JNRSC could not sell lands timely due to the restriction of land sales that JNRSC had by the government in order not to raise land prices. As a result, debts had been increased to 28.3 trillion yen in October 1998 in spite that it had already sold 6.5 trillion yen[60] of land (7,800 of 9,250 ha succeeded from JNR) and 2.5 trillion yen of JR stock.

Therefore, the government has legislated the law in 1998 that transfers JNRSC's liabilities of 24.1 trillion yen to the general account of the national government. The liabilities will be repaid within 60 years by the national government, which makes the repayment of principal 400 billion yen and the interest payment 600 billion yen annually[61]. 225 billion yen of these annual payments will be covered by the cigarette tax raise, but there are no certain sources for the rest of repayment. A certain source of the repayment is strongly needed such as Road Improvement Special Account, which is now exclusively used for road projects (Mainichi Shinbun, 1998). Four trillion yen and 0.2 trillion yen of the remaining liabilities of 4.2 trillion yen[62] are succeeded to JRCC and JRs, respectively. JNRSC has been dissolved, and unsold lands and stocks which were owned by JNRSC are also succeeded to JRCC to cover its liabilities succeeded from JNRSC.

---

[60] Source: Mainichi Shinbun, "*Kokutetsu Seisan Jigyodan Asu Kaisan* (in Japanese, JNRSC Dissolves Tomorrow)," http://www.mainichi.co.jp/eye/feature/article/digital/26/26_7.html, October 21, 1998

[61] Source: Japan Railway Construction Corporation

[62] 4.2 trillion yen consists mostly of pension payable to former JNR employees and JR employees.

Three Island JRs

At the time of privatization, each of three island JRs has been provided its own Management Stabilizing Fund in the form of debt owed to the three island JRs by the JNRSC for redeemable period of 10 years. The rationale for providing a one-time fund rather than providing subsidy each year is to give incentives to the management for efficiency improvement. The funds set a ceiling amount of compensation for the loss, and this ceiling has been recognized by both management and employees as a management target.

However, three island JRs still have to rely on Management Stabilizing Fund. Although the productivity of three island JRs has been increasing (), both JR Hokkaido and JR Kyushu have had losses even after revenues from the fund was provided (Exhibit 4-16). One of the reasons is that the decrease in interest rate has affected the revenue from the fund[63] (Fukui et al, 1994). Three island JRs are further away from the criteria of listing their shares to stock market and being denationalized. Splitting up into regional companies has a huge challenge for the privatization of the nationwide infrastructure.

[63] The repayment plan of the Management Stabilizing Fund when the scheme was set in 1987 had an interest rate of 7.3%, but the average bank-lending rate has declined from FY7.7% in 1990 to 4.1% in FY1993 (Fukui et al, 1994).

JR Hokkaido	1987	1988	1989	1990	1991	1992	1993
Operating revenue	92	94	100	105	106	105	106
Operating expenditure	-145.8	-147.3	-152.7	-154.0	-154.3	-151.8	-151.4
Operating loss	-53.8	-53.3	-52.7	-49.0	-48.3	-46.8	-45.4
Revenue from the fund	49.8	49.8	49.6	49.0	49.0	46.9	44.4
Difference b/w Operating loss and Revenue from the fund	-4.0	-3.5	-3.1	0.0	0.7	0.1	-1.0

JR Shikoku	1987	1988	1989	1990	1991	1992	1993
Operating revenue	35	44	44	48	51	51	50
Operating expenditure	-49.9	-54.8	-55.6	-56.7	-60.0	-62.0	-61.3
Operating loss	-14.9	-10.8	-11.6	-8.7	-9.0	-11.0	-11.3
Revenue from the fund	15.2	15.2	15.2	15.0	14.2	14.1	13.5
Difference b/w Operating loss and Revenue from the fund	0.3	4.4	3.6	6.3	5.2	3.1	2.2

JR Kyushu	1987	1988	1989	1990	1991	1992	1993
Operating revenue	130	140	144	151	160	167	173
Operating expenditure	-158.8	-168.5	-172.7	-179.7	-188.1	-194.5	-199.8
Operating loss	-28.8	-28.5	-28.7	-28.7	-28.1	-27.5	-26.8
Revenue from the fund	28.3	28.3	28.3	28.2	27.9	27.5	25.2
Difference b/w Operating loss and Revenue from the fund	-0.5	-0.2	-0.4	-0.5	-0.2	0.0	-1.6

Source: Fukui et al, 1994

Exhibit 4-16 Operating Loss and Fund Revenue of Three Island JRs

4.2. Autostrade S.p.A. in Italy

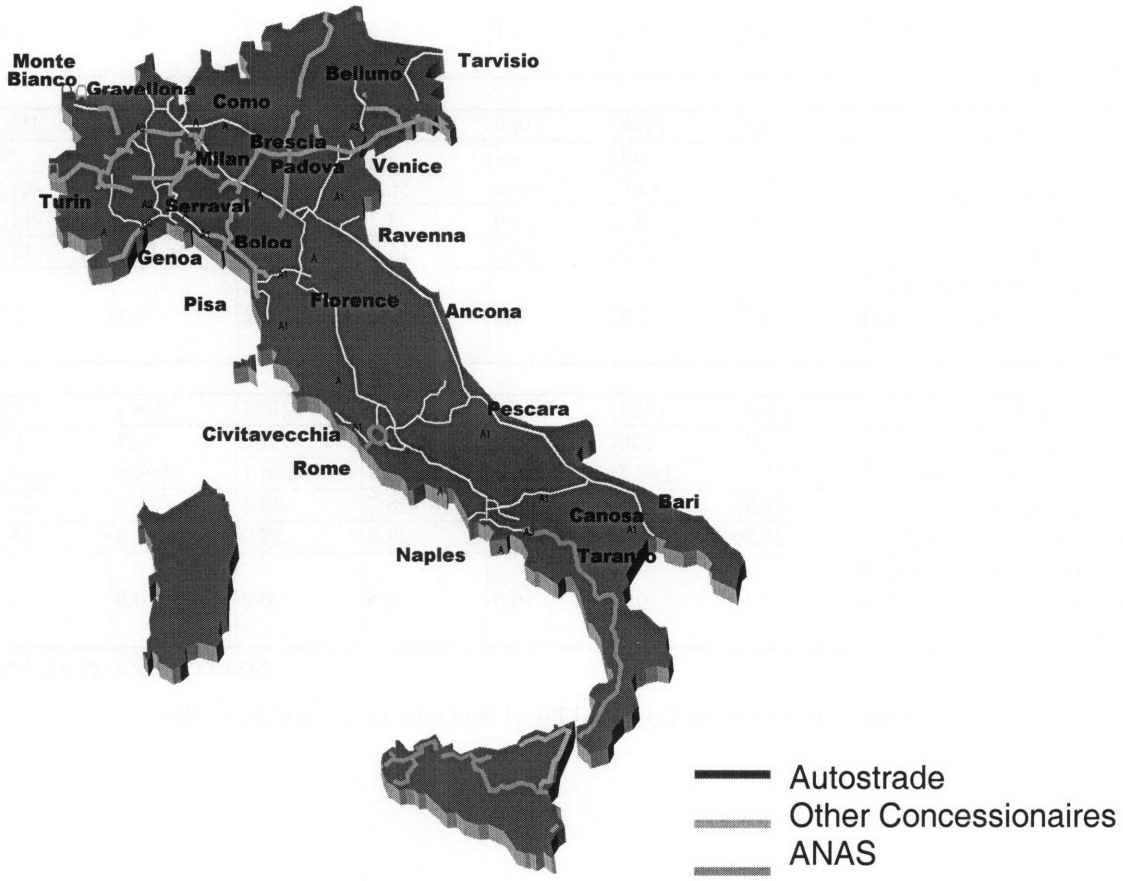


Exhibit 4-17 Network of Autostrade S.p.A.

Autostrade S.p.A. is a concessionaire that operates and maintains highway network in Italy. It has a toll road network of 3,120km (2,854.6km in 1998) among 6,478km of national highway network, and it is located mostly north of Italy (Exhibit 4-17). Autostrade was once semi-public concessionaire, whose share was held by the government. It has been privatized since 1999 after selling shares both privately and to the financial market. The company operates its network under concessions with ANAS, the National Road Agency, which operates toll-free highways mainly in the

south of Italy. Under the current concession agreed in August 1997, the concession period is for 42 years until December 31st, 2038. At the end of the concession period, highway assets will be relinquished from Autostrade to ANAS.

Before Privatization

Autostrade was established in 1956 with equity entirely provided by a government agency, IRI (Institution for the Industrial Reconstruction). Before that, IRI itself had been engaged in the construction of highways. The grant of concession started in 1955, and there were a lot of concessionaires[64], mostly semi-public company, which was granted concessions from the government. Autostrade was granted a concession to build, maintain, and operate toll highways from the national government of Italy, and the first concession was to build the Milan-Naples motorway. Autostrade became the largest concessionaire by being granted several concessions in 1961, 1968, and 1982, while the others were awarded concessions for single route per company.

The funding was mainly provided from the government as subsidies in the early years. However, in 1968, the policy changed to provide fewer subsidies. In exchange, the concessionaires are allowed to extend concession period[65], to raise toll rate by indexing it to inflation, and to provide cross-subsidies within the concession. The

[64] There were 28 toll highway concessionaires in 1993, including 27 semi-public concessionaires.
[65] The concession period was extended until the end of 2003 for all the routes. Before that, the period had been set for individual routes at 30 years.

toll rates within a concession had been more or less uniformed, and the toll rate had been raised almost every year since then.

In 1970s, Italy suffered from severe recession after oil crisis. At first, the government suppressed the toll rate to stabilize the general price levels even though traffic growth slowed, construction cost nearly trebled, and interest rate rose sharply. As a result, a number of concessionaires went into default. The government dealt with the situation by suspending construction of new motorways in 1975, and by creating a special account, managed by the Central Guarantee Funds, with the fund from raising toll rate to cross-subsidize financially troubled concessionaires in 1978. Financial support amounted to 1.5 million lira by 1985, with 600 million lira provided by the national government through the Funds, 600 million lira from the special account of the Funds, and 300 million provided by ANAS. Also, the government made a legislature to transfer part of the routes of financially troubled concessionaires to Autostrade.

In 1982, after economy stabilized in the early 1980s, the government announced a renewed development plan including the construction of new 1,400km of highways, and the extension of the concession period to the end of 2018 in return for acquiring financially troubled concessionaires, completing certain uncompleted routes and operating them.

In recent years, Autostrade is known for its financial soundness. It was achieved because it concentrated primarily on widening of existing highways rather than

constructing new routes. It has been operating profitably although subsidies from the government have declined.

Privatization of Autostrade

In July 1994, the law about privatizing public corporations owned by the national government has been legislated. Privatization in this case means denationalization by selling shares held by the government to the public. The Italian cabinet decided to sell shares of Autostrade held by IRI in May 1997. The sale of shares was held in two stages. The first stage was in December 1999, when 70% of shares were sold to private and institutional investors through public offering. The second one was in March 2000, when 30% of shares were sold to the consortium of investors, which consists of six major private companies such as Edizione Finance SA. The revenue of these sales went to IRI to repay debts that IRI owes.

After privatization, Autostrade runs toll road business in the US and the UK. In the US, Autostrade International, a subsidiary of Autostrade S.p.A. formed a consortium called TRIP II to build, maintain, and operate Dulles Greenway in Virginia. In the UK, Autostrade UK Limited, another subsidiary of Autostrade S.p.A, formed a concessionaire called Midland Expressway Limited with Australian company[66] to design, build, finance, and operate "M6 Toll," Birmingham Northern Relief Road. This road is 48km long, expected to be open to traffic in 2004[67], and will

[66] At first, the joint venture was with British company, but it was replaced by Macquarie Infrastructure Group of Australia.
[67] Source: Midland Expressway Limited, http://www.bnrr.co.uk/home.htm, Jan 11th 2002

be the first toll road in the UK. Also, Autostrade has a subsidiary in the telecommunication business with its optic fiber network. The optic fiber now forms 3,427km of network along the toll roads.

It can be said that Autostrade has been increasing its profit because of privatization. As is shown in Exhibit 4-18, return on revenue has been increasing as well as revenues and net income. This is because of increase in revenues and decrease in operating costs. Toll revenues, which comprise 93% of total revenues, increased due to 1.55% of increase in toll rate and 3.6% of increase in traffic volume. Other revenues, such as revenue from service areas or Telepass (electronic toll collection system) operations also increased. The operating cost decreased in 2000 compared with 1999 due to the effort of cost reduction in personnel and maintenance areas (Autostrade, 2001). In a personnel area, Autostrade has decreased in labor cost by reducing 3.8% of employees, de-layering the organization structure such as centralizing purchasing activities, and automating of toll collection[68]. In a maintenance area, it has improved operational standard, and applied low cost technologies in maintenance activities such as paving, lateral guard rails, noise reduction barriers, etc. Also, it has been making effort to reduce maintenance cost by grouping of contracts and contracting with direct negotiations without having tenders. Autostrade has set a goal for 2005 to improve more efficiency.

[68] In 2001, 60.2% of toll was collected automatically (Source: Autostrade, 2001).

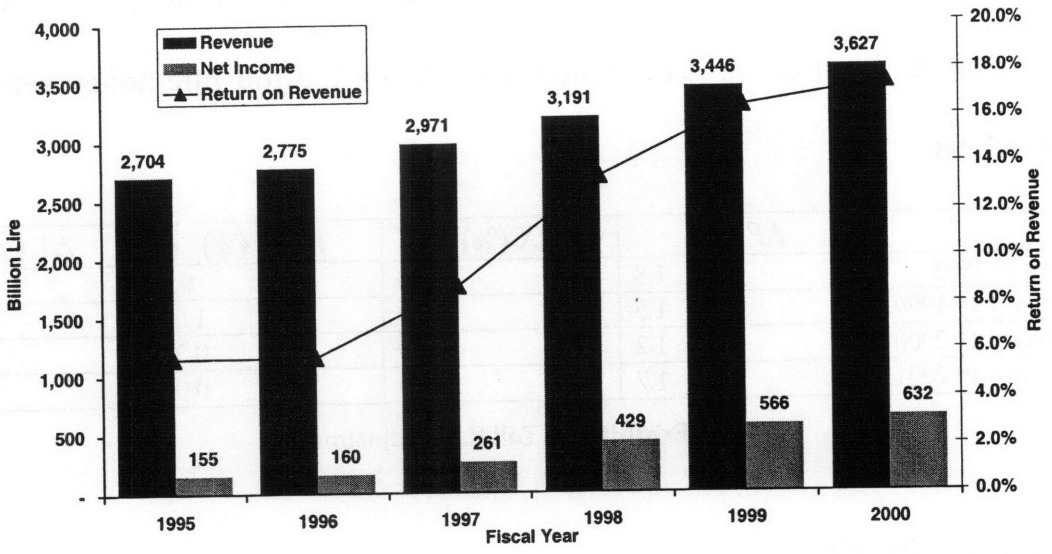


Exhibit 4-18 Return on Revenue of Autostrade[69]

Toll is adjusted with the method established by the CIPE (Italian Interdepartmental Committee for Economic Planning) to introduce more incentive for productivity improvement. It was approved in 1996, and has been applied to Autostrade since 1998. The mechanism of toll adjustment is defined as follows:

$$\Delta T \leq \Delta P - X + \beta \Delta Q$$

where ΔT is the change of toll rate, ΔP is the projected rate of inflation, X is the expected rate of productivity, and $\beta \Delta Q$ is the factor related to quality of service. $\beta \Delta Q$ is measured by the structural state of paving and the accident rate. The objective of X allows for the compensation of the costs deriving from the investment plan assigned to the company in the concession. Upon renewal of the concession, the value of X is agreed to be set as zero until 2002. Therefore, the rate can be raised by

[69] Source: Autostrade S.p.A., 1995-1997 data: Annual Report and Financial Statements 1999; 1998-2000 data: Annual Report 2000

the rate of inflation plus quality indicator, and thus Autostrade gets an incentive to improve the level of service. Exhibit 4-19 shows the toll rate adjustment applied since 1998.

	ΔP (%)	X (%)	$\beta \Delta Q$ (%)	ΔT (%)
May 7th 1998	1.8	0	0.5	2.3
January 1st 1999	1.5	0	1.59	3.09
January 1st 2000	1.2	0	0.35	1.55
January 1st 2001	1.7	0	0.09	1.79

Exhibit 4-19 Toll Rate Adjustment[70]

Financial Situation

As is described before, Autostrade has a sound financial situation. The ratio of debt over contributed capital is 2.7 in 2000, and it has been decreased in recent years with the effort of debt repayments (2.8 in 1999 and 3.2 in 1998). This ratio is low compared with Japanese highway public corporations (see Chapter 2.1.3.1). This sound capital structure is largely due to the suspension of new construction in 1970s when the economic was in recession and inflation and interest rate was both high. Also, debt repayment is possible because expenses are mainly in operation, rather than in investment. The investment for tangible fixed assets, such as highway construction, is relatively low compared to JHPC because the investments are more to the improvements of the existing network (Exhibit 4-20).

[70] Source: Autostrade S.p.A., 1998-2000 data: Annual Report and Financial Statements 1999, 2001 data: Annual Report 2000

	Autostrade (million lire)				JHPC (million yen)	
	1999		1998		2000	
New construction	26,400	6%	42,200	18%	1,463,005	85%
Improvement	410,800	94%	193,900	82%	262,693	15%
Total investment	437,200	100%	236,100	100%	1,725,698	100%
Net income	565,814		428,754		422,995	
Investment/Net Income	77%		55%		408%	

*Net income of JHPC is after depreciation

Exhibit 4-20 Investment in New Construction and Improvement[71]

Exhibit 4-21 and Exhibit 4-22 show the balance sheet and the income statement of Autostrade.

Assets	**2000**	**1999**	**1998**
Cash and Equivalents	60,697	29,940	60,972
A/R	668,400	550,208	487,438
Inventory	223,951	218,566	264,786
Other Current Assets	318,154	354,114	319,707
Tangible Fixed Assets	8,079,052	8,008,267	7,923,125
Intangible Fixed Assets	86,062	76,521	17,729
Other Fixed Assets	903,059	756,078	664,451
Total Assets	10,339,375	9,993,694	9,738,208
Liabilities			
A/P	657,607	683,235	578,345
Provision for risks and charges	67,760	67,932	965,042
Provision for costs of repair or replacement of assets to be relinquished	1,407,800	1,224,000	
Provision for employee severance indemnities	229,942	218,021	285,972
Other Current Liabilities	947,924	991,649	963,205
Short-term Debt	1,171,334	1,005,218	814,869
Long-term Debt	2,065,565	2,342,005	2,962,865
Total Liabilities	6,547,932	6,532,060	6,570,298
Equity			
Share capital paid	1,183,083	1,183,083	1,183,000
Retained Earnings	2,608,360	2,278,551	1,984,910
Total Equity	3,791,443	3,461,634	3,167,910

(In millions of Lire)

Exhibit 4-21 Balance Sheet of Autostrade S.p.A[72]

[71] Source: Autostrade S.p.A., Annual Report 1999, and JHPC, Annual Report, 2001 and Governmental Cost Statement

	2000	1999	1998
Revenues	**3,627,049**	**3,446,321**	**3,191,391**
Net Toll Revenues	3,379,695	3,208,618	
Other Motorway Revenues	230,911	208,749	
Other Income and Revenues	16,443	28,954	
Operating Costs	**2,060,531**	**2,230,110**	**2,160,942**
Raw Materials and External Service Consumption	781,968	836,510	
Net Labor Costs	655,326	663,527	
Other Costs	24,474	26,512	
Depreciation	385,729	359,005	
Provisions for risks and charges	187,800	16,556	
Other Provisions	25,234	328,000	
Operating Income (EBIT)	**1,566,518**	**1,216,211**	**1,030,449**
Interest and Extraordinary Expense	**401,667**	**189,771**	**288,419**
Income before Tax	**1,164,851**	**1,026,440**	**742,030**
Income Tax	**533,083**	**460,626**	**313,276**
Net Income	**631,768**	**565,814**	**428,754**

(In millions of Lire)

Exhibit 4-22 Income Statement of Autostrade S.p.A[72]

Among debts, 70% are long-term debts. Bonds are issued until 1997 with maturity of five to ten years. They have a floating interest rate, and were mainly placed on international market as Eurobonds. The bond issued in 1993 had interest rate swap contracts, and the contracts were taken out in 1997 to convert its floating interest rate to a fixed rate. The maturities of long-term loans vary from 9 to 15 years. Long-term loans are both from several banks and from IRI, a parent company of Autostrade at that time. Loans are well diversified in terms of currency (lire, European Monetary Union currencies, and non-EMU currencies particularly US dollar, Swiss Franc, and Japanese yen), the guarantee against exchange loss, the type of the interest rate, and whether European Investment Bank (EIB) offers grants or

[72] Source: Autostrade S.p.A., Annual Report 2000, 1999

not through banks (Exhibit 4-23). As a result of the combination of short-term debts with this diversity in long-term debts, the average overall borrowing rate for Autostrade decreased to 6.46% in 1999, the lowest rate since 1980, from 7.7% in 1998 despite of the increase in interest rate for all the countries in EMU.

		Total	EIB		Exchange loss			Interest rate	
			Indirect EIB	Non-EIB	Totally guarantee	Partially guarantee	w/o guarantee	Fixed	Variable
Bonds		**750,000**							
Bank loans	in non-EMU foreign	96,648	23,629	73,019	0	96,648	0	96,648	0
	in EMU foreign currencies	1,048,668	185,142	268,877	67,769	889,522	91,377	405,809	642,859
	in Lire	195,384	99,932	95,452				82,790	112,595
	Total	**1,340,700**	**308,703**	**437,348**	**67,769**	**986,170**	**91,377**	**585,247**	**755,454**
Loans from	in non-EMU foreign	88,542			88,542	0	0	88,542	0
	in EMU foreign currencies	128,989			126,995	0	1,994	126,995	1,994
	in Lire	33,774						33,774	0
	Total	**251,305**			**215,537**	**0**	**1,994**	**249,311**	**1,994**

Exhibit 4-23 Diversity of Autostrade's Debts[74]

Lessons from Autostrade

Autostrade's experience prevails the following important lessons to the highway public corporations in Japan.

- Achievement of financial soundness with flexibility in road construction investment.
- Achievement of sound capital structure with efficient capital contributed by the government and by the public.

[74] Source: Autostrade, 2000

- Diversifying financing risks by combining short-term and long-term debts, fixed and variable interest rates, and domestic and foreign currencies.
- Achievement of operational effectiveness with accountability to shareholders derived by privatization

Chapter 5. The Application for Privatization of Highway Public Corporations

As we looked at the situation in the highway public corporations in Japan in Chapter 2, there are two main problems in the present situation of highway public corporations: financial problems, and political or government interferences. In this chapter, we will discuss the feasibility of reform of the highway public corporations with two options: (1) without privatization and (2) with privatization. Also, we will discuss the form of privatization.

5.1. Financial Reform Without Privatization

5.1.1. Feasibility of Debt Repayment

The question arises whether debts of the highway public corporations in Japan are repayable without privatization. As far as I am concerned, the highway public corporations cannot repay their debts because of the following reasons: (1) the public corporations have optimistic forecast in future toll revenues, (2) the public corporations are relying too much on debts and therefore are in a debt spiral, (3) in JR case, JRs can sustain their sound financial condition after they have transferred their debts initially to JNRSC and finally to taxpayers.

Toll Revenue Prediction

The accuracy of the toll revenue prediction has a big impact on the future financial situation of the highway public corporations. However, past achievements show that the predictions were very optimistic. Since JHPC applies the pooling system for the national motorways (see 2.1.3.2) and MEPC and HEPC have their own pooling system, it is very difficult to figure out whether their toll revenue prediction is accurate or not in the long term. Therefore, we should find out from past records of JHPC's regional motorways and HSBA's three Honshu-Shikoku highways.

JHPC operates 64 routes of regional motorways as of December 1998. These routes basically should pay for themselves. According to the written advice[75]from the Ministry of Public Management, Home Affairs, Posts and Telecommunications submitted to the MLIT based on their inspection, 42 of 64 routes have a smaller traffic volume than predicted in 1998, and 26 of the above 42 routes have operating losses. The degree of shortage for 26 routes that have operating losses is shown in Exhibit 5-1. Seven of these roads have operating expenses including interest twice as much as operating revenues. The Ministry of Public Management, Home Affairs, Posts and Telecommunications did its own analysis of the future traffic volume for 20 routes and concluded that seven of them cannot fully redeem their liabilities

[75] Ministry of Public Management, Home Affairs, Posts and Telecommunications, "*Kosoku Doro ni kansuru Gyosei Kansatsu Kekka ni motozuku Kankoku* (in Japanese, the Written Advice based on the Result of Inspection of the Administration about Highways)," http://www.soumu.go.jp/kansatu/koukikaku.htm, August 8th 2000

within their redemption period even though they can keep profitability, and nine of them will not make profit and therefore their liabilities becomes more than their assets. JHPC has a reserve for losses on regional motorway operations and the liabilities remaining at the time of transfer to the government will be compensated from the reserve. However, this is an example to show that the prediction is very optimistic.

	Traffic Volume	Toll Revenues
Less than 50% of Prediction	13 routes	14 routes
50-70% of Prediction	10 routes	8 routes
70-99% of Prediction	3 routes	4 routes

Exhibit 5-1 Shortage of Toll Revenues in comparison with Prediction in Regional Motorways

Another example is about HSBA. HBSA has its own pooling system for three Honshu-Shikoku highways, and all the routes have been open to traffic since May 1999. However, with the completion of the entire plan, it turned out that its revenues are insufficient to repay its debts. Exhibit 5-2 shows that HSBA's expenses including interest are nearly twice as much as its revenues. The expenses here do not include depreciation, and therefore the financial situation is much worse than is shown here.

	Operating Revenues	*Operating Expenses (w/o Depreciation)*	*Earnings before Depreciation*
1996	50.8	107.1	-56.3
1997	60.6	105.3	-44.7
1998	85.6	154.5	-68.9

(Billion yen)

Source: Ministry of Public Management, Home Affairs, Posts and Telecommunications

Exhibit 5-2 Revenues and Expenses of HBSA

Moreover, the redemption plan of HBSA's debts is possibly based on the optimistic traffic volume prediction. According to the Ministry of Public Management, Home Affairs, Posts and Telecommunications, the redemption plan in December 1997 predicts that the net income will be positive after 2006, and debts will be repaid in 2045 assuming that the governments will fund HSBA's equity of 80 billion every year. However, HBSA's situation is quite serious. Exhibit 2-22 shows that revenues are not sufficient enough to redeem its debts. Also, there are interesting Exhibits to show how HSBA forecast its revenues. Exhibit 5-3 shows the change in traffic volume in the redemption plan and the actual traffic volume. The redemption plan of Seto-chuo Expressway (see a map in Exhibit 2-6) was changed for three times after its opening in 1988. The plan was changed in 1991 due to the big difference between predicted and actual traffic volume. However, this plan just adjusted to the actual volume for the first several years, and HSBA predicted the rapid growth after a while. Again, it turned out that the projected growth was so high that the actual traffic volume became 63% of the prediction, and the plan was changed in 1997. In 1997, HSBA changed the redemption period from 33 years to 50 years, but the situation is still very bad. This table shows that the accuracy of the traffic volume projection is not the argument of technical factors. The traffic volume is optimistically predicted to meet the redemption plan intentionally. This is why the initial traffic volume is curbed in order to meet the actual one but increases dramatically after that in the 1991 Plan.

	Predicted Traffic Volume			Actual
	1988 Plan	1991 Plan	1997 Plan	
1988	24,900			10,823
1989	26,040			9,070
1990	27,240			9,809
1991	28,410	11,370		11,256
1996		24,020		15,211
1997		27,920	15,860	16,177
1998			17,390	15,793
1999			16,650	15,471

(Billion yen)

Exhibit 5-3 Traffic Volume of Seto-chuo Expressway of HSBA[76]

As mentioned before, the traffic volume prediction of the pooling system of JHPC's national motorways, MEPC, and HEPC is difficult to evaluate because (a) the redemption plan is based on the traffic volume prediction not for individual routes but for collective network, and (b) the redemption plan, on average, changes every 2.5 years. However, it is very likely that the prediction here is also optimistic. According to Kato et al (2001), JHPC is manipulating its toll revenue forecasts to meet the needs for both the actual toll revenues in the short term and the redemption plan in the long term. He makes an argument with two facts: (a) the traffic forecast is set to increase despite that the population is predicted to decrease in the future, and (b) manipulating their toll revenue forecasts to meet the actual toll revenues in a short term.

[76] Ministry of Public Management, Home Affairs, Posts and Telecommunications, "*Kosoku Doro ni kansuru Gyosei Kansatsu Kekka ni motozuku Kankoku* (in Japanese, the Written Advice based on the Result of Inspection of the Administration about Highways)," http://www.soumu.go.jp/kansatu/koukikaku.htm, August 8th 2000

First, the traffic revenue is forecasted to grow steadily until 2020 and will be constant after that according to the redemption plan of April 1999 (Exhibit 5-4). This is based on the increase in the passenger-kilometers forecasted by the Ministry of Construction in August 1997[77]. However, according to the National Institute of Population and Social Security Research, the population in Japan will decline after 2009[78]. Also, society is aging and the proportion of population of age 15-65 was 68.1% in 2000 and will be 59.1% in 2020. It is natural to consider that travel length and toll revenues decline with both a decline in population and an aging society within a given highway network. The toll revenue increase would be unlikely to happen as is forecasted.

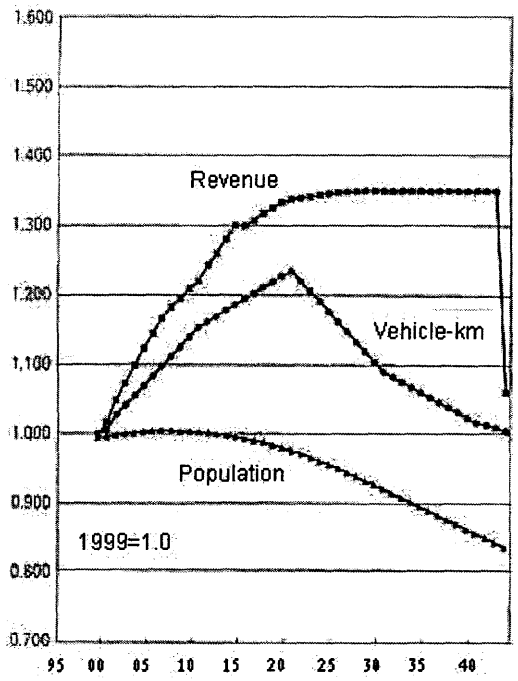


Exhibit 5-4 Future Prediction of Population and Revenues[79]

[77] New Five-year Road Development Plan, August 1997.
[78] National Institute of Population and Social Security Research, "Projected future population and proportion by age group, 2000-2050: High variant"
[79] Source: Kato et al, 2001

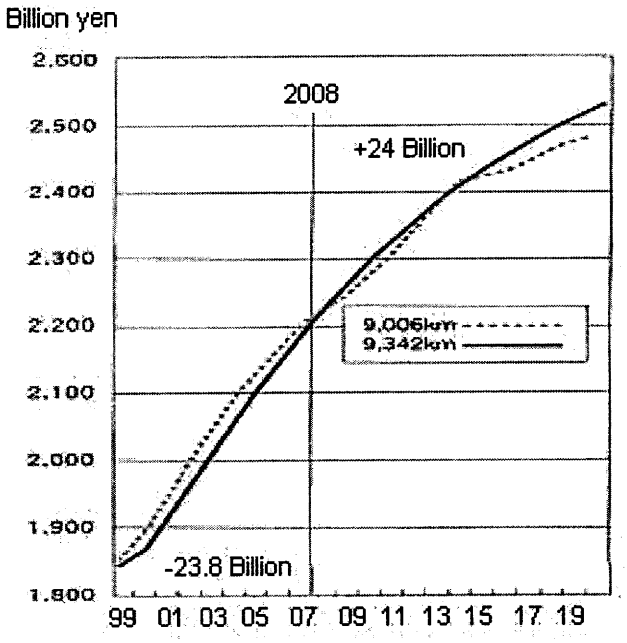


Exhibit 5-5 Redemption Plan of JHPC[80]

Second, it is possible to manipulate the toll revenue prediction earlier in the redemption period to meet the possible actual revenues in the short term. Kasai (2001), the president of JR Central stated that he was told by his boss when he worked for JNR that a restructuring plan should be made as if the forecast met the actual revenues just for the first two years because the plan would be revised in two years. The predicted revenue increases and the cost decreases after three years, and the balance would be positive just in the final year of the plan. JHPC could do the same as JNR considering the fact that the redemption plan is revised, on average, every 2.5 years. Kato et al compared the JHPC redemption plan of the highway network of 9,006km in April 1999 and the plan of highway of 9,342km submitted to the National Road Council in December 1999 (Exhibit 5-5) and pointed out that

[80] Source: Kato et al, 2001

JHPC intentionally curbs the revenue initially and meet the total amount in the long run. The fact is that the predicted toll revenues for the redemption plan of the longer highway network (9,342km) are smaller in the short run and larger after 20 years in spite that the longer highway network should have larger toll revenues and construction costs.

Considering all these facts, the toll revenue prediction of the highway public corporations is too optimistic to repay their debts.

Debt Spiral

Second, as is shown in Exhibit 2-8, the debt to equity ratio of the highway corporations is very high, and their interest expenses are eating up profits. Exhibit 5-6 shows that the large portion of revenues are expended as an interest. Especially, 60% of revenue from both regional motorway of JHPC and HEPC is spent as an interest expense. The corporations cannot sustain their growth because they are in a debt spiral; they have to rely on issuing debts in order to satisfy their debt repayment. Exhibit 5-7 shows that the debt amount each year is much larger than the construction costs in JHPC, and therefore JHPC needs more cash than they invest on assets to pay debt principle and interest. If this were the case in private sectors, their debts would be in default because (a) the possibility of bankruptcy would be recognized higher, (b) the credit rate of debts would be lower and their bonds would be recognized as junk bonds, and (c) no one would buy their risky debts and therefore they could not repay their debt outstanding. This situation has

already happened when JHPC failed to issue FILP agency bonds without the government guarantee for the amount of 85 billion yen among the planned 150 billion yen bond issues[81]. Without the government guarantee, the highway public corporations bear financing risk of market environment and the future of the public enterprises, and the corporations will be more and more vulnerable if they insist in the present situation.

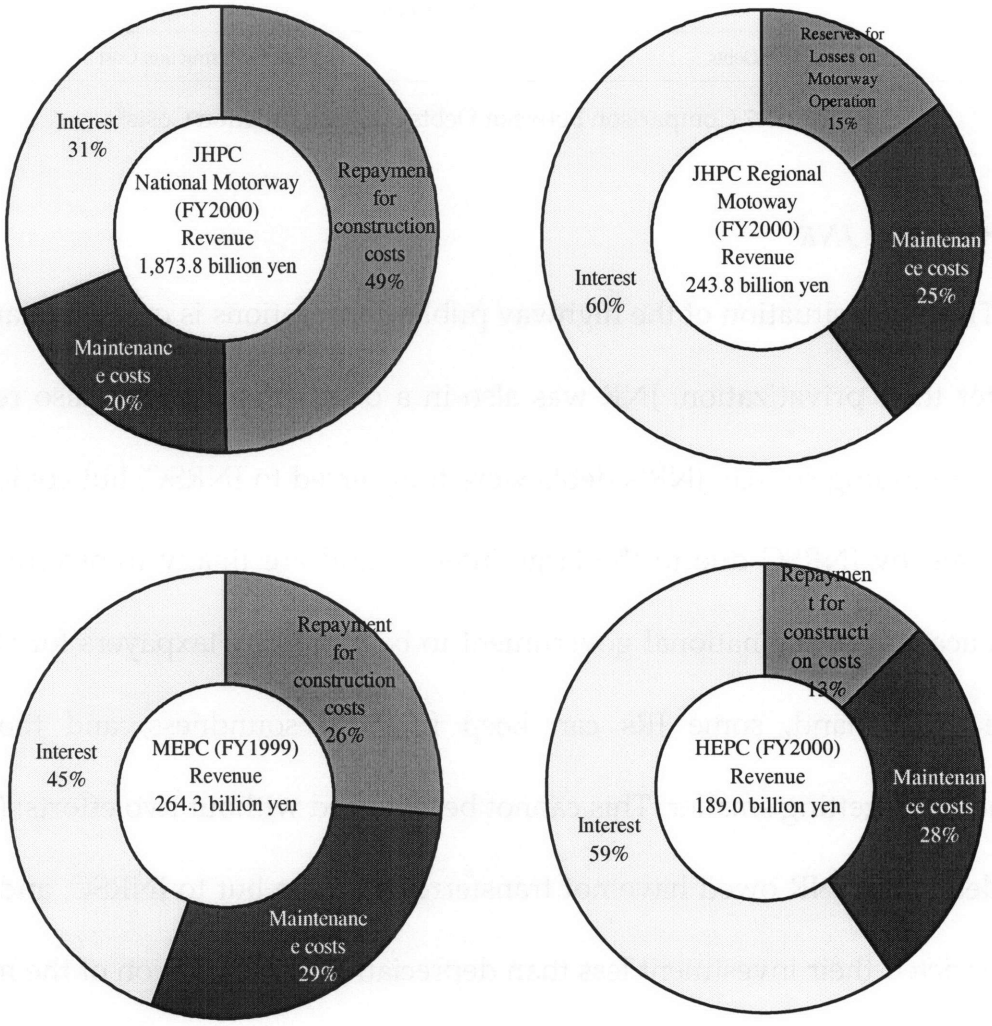


Exhibit 5-6 Percentage **of** Interest Payment over Revenue

[81] Jiji Press, "JHPC Gives Up Part of Debt Issue Plan for FY '01," March 20th 2002

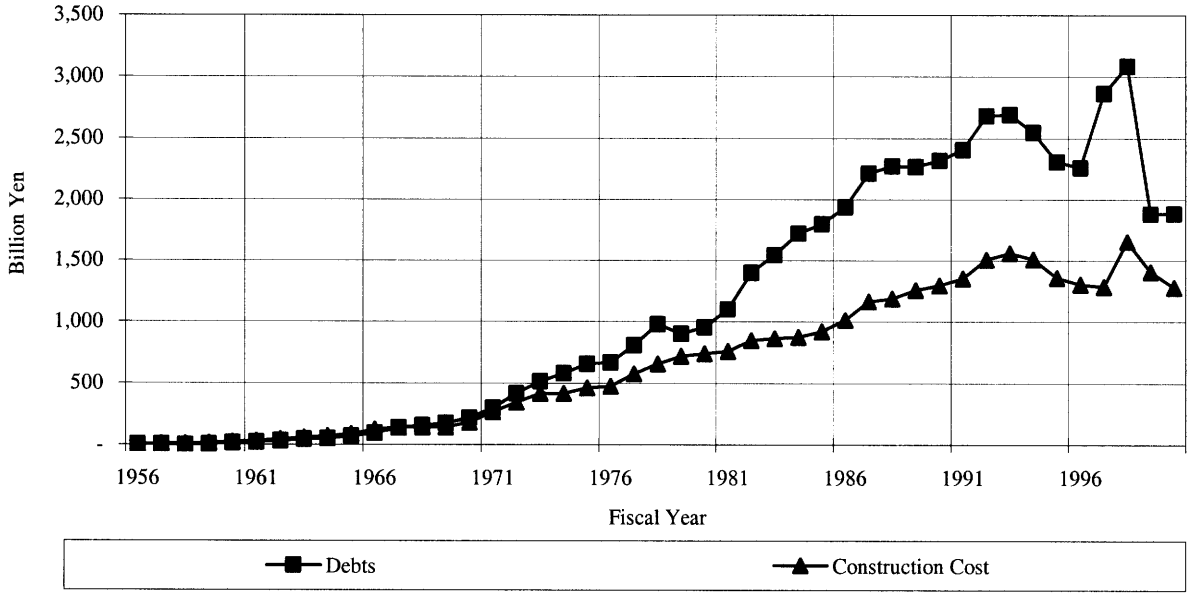


Exhibit 5-7 Comparison between Debts and Construction Costs[82]

Comparison with JNR

Third, the situation of the highway public corporations is quite similar to JRs' case after their privatization. JNR was also in a debt spiral, since it also relied on debts as a funding source. JNR's debts were transferred to JNRSC, but could not be fully repaid by JNRSC due to the large interest, and are finally transferred to the general account of the national government to be repaid by taxpayers for 60 years. On the other hand, some JRs can keep financial soundness, and their debt outstanding is getting smaller. This cannot be achieved without two efforts: (a) most of the debts that JNR owed have not transferred to them but to JNRSC, and (b) JRs have restricted their investment less than depreciation. The situation of the highway public corporations is worse than JNR from the viewpoint of their revenues

[82] JHPC, "*Nempo* (in Japanese, Annual Report) 2001"

compared with their liabilities (see Exhibit 2-29), and therefore the effort to keep financial soundness will be much larger than JRs.

5.1.2. Needs for Equity Funding

From the three reasons in the previous section, it is very likely that the highway public corporations cannot repay their debts. To solve the problem, we first have to consider two options: (1) keep constructing new routes, or (2) minimize new investments on construction.

Equity from Road Improvement Special Account

The first case is that politicians, governments, or management of the highway public corporations itself keep the public corporations building their highways. In this case, the funding source should not rely on debts, which is borne by highway users, but much more on equity from the governments, which is the taxpayers' burden. In the present situation, the financing risk is borne too much by both taxpayers and highway users. This is a lose-lose situation. In the case of JNR, taxpayers bear the burden after all when the public corporation is in financial problem. They have to bear the risk of default not only as shareholders but also as debt holders by guaranteeing junk bonds. When it is obvious that they have to bear the risk after all, it is much wiser for them to bear the cost at the much earlier stage before the interest payment grows too large. On the other hand, in the case of Tokyo

Bay Aqua Line (see 2.1.4), highway users within the new pooling system bear the burden of enormous debts[83]. In this case, it is still unpredictable that the debts are repayable only by the source from highway users.

To fund equity for the highway public corporations, I would suggest that the government change the priority of the investment of Road Improvement Special Account to highway construction. At present, the Special Account is spent mainly on national roads and local roads, and very little portion on highways (12%[84] in 2001). The priority for highways should be higher than local roads for the national government since the impact of highways on the national economy is much higher than local roads. Also, subsidies for highways from the government are much larger in other developed countries (Exhibit 5-8). Since the debt amount that JHPC issued annually for the last ten years is just half of the annual amount of Road Improvement Special Account, a slight increase of the ratio for highway investment within the special account has a significant impact on decreasing debt funding. For example, spending 20% of the Special Account on toll roads annually would have helped decreasing the JHPC's interest by about 42%. This is a matter of priority, and can be achieved without raising taxes by giving up investment on some regional roads.

---

[83] In 2000, the redemption plan of Tokyo Bay Aqua Line has changed by (1) Tokyo Bay Aqua Line has been included in the pooling system of three motorways in Chiba, and (2) extension of redemption period from 30 years to 50 years. The change has been made to deal with the actual traffic volume much lower than is predicted.

[84] The portion of highway investment less FILP funding, over the total funding for national and local road investment from Road Improvement Special Account.

Country	Subsidies from the Government
Italy	Subsidies comprise 30% of recent construction costs.
France	Interest-free loans comprise 37% of all the cumulative construction costs.
Korea	Equity comprises 50% of construction costs.
Japan	Equity and Subsidies comprise 12% of construction costs in 2000.

Exhibit 5-8 International Comparison of Subsidies to Highway Investment[85]

Suspension of New Constructions

However, the new construction still matters for the public corporations even if taxes from the special account are funded on equity. There are two problems: (a) an increase of fund from a special account can only cover new construction but not debt repayment, and (b) the investment of highway projects in the future has a high risk and a low return.

First, Exhibit 5-9 shows the ratio of construction costs for JHPC over the annual amount of the Road Improvement Special Account (RISA). Since the construction cost is equivalent to 26% of the RISA on average, we can know that the equity will be just used for the new construction even if nearly 30% of the amount of the special account is used to fund the equity. Therefore, the debt outstanding does not decrease, and the public corporations still bear the large interest payments of debt outstanding.

[85] JHPC, http://www.jhnet.go.jp/faq/keigen.html (in Japanese), March 2002

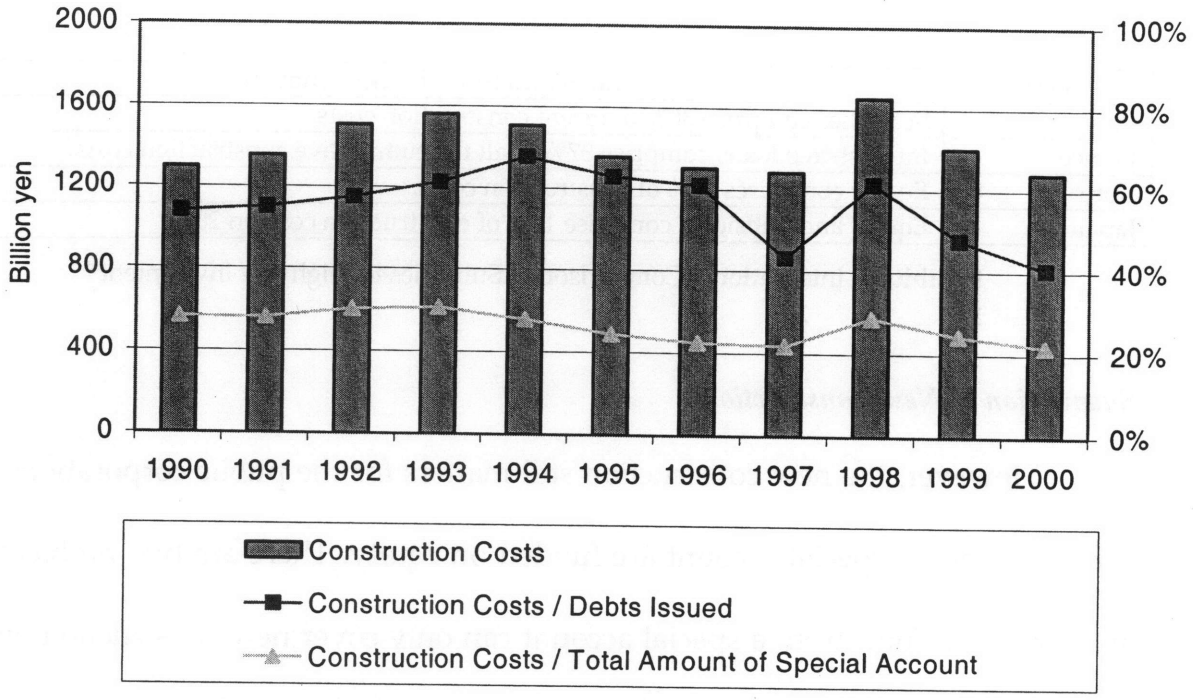


Exhibit 5-9 Construction Costs and Road Investment Special Amount[86]

Next, the return on investment on new construction cannot be expected good enough to cover construction costs. The remaining 3,825km of 11,500km network set in the 1987 amendment of the Law for Construction of Arterial Motorways for National Land Development is mainly in rural area, and demand are not expected to be so high. The routes whose revenues are larger than their costs consist of main trunk highways or are mainly located near large cities. Also, already 94% of the population can reach highway interchanges within one hour[87], and therefore highway users are not expected to have a large increase by incremental expansions

[86] Source: Construction Costs: JHPC, Annual Report, 2000; Road Improvement Special Account:: MLIT, "*Doro Tokutei Zaigen ni kansuru Data-shu* (in Japanese, Data about Road Improvement Special Account)," http://www.mlit.go.jp/road/zaigen/zaigen.htm, March 2001

[87] National Highway Construction Council, "*Kousoku Douro Binran* (in Japanese, Highway Handbook) 2000," 2001

of highway network. Therefore, new construction does not improve, but it may worsen the situation.

Highways are definitely important in rural areas for economic or emergency medical activities, but that does not mean you can ignore the financial constraint and develop as many highways as you want. Highway projects are feasible only when the government or the public corporation can keep financial soundness. Taxpayers bear the financial risk after all, and therefore, the government should be accountable for the financial situation. Considering the fact that the financial situation of the highway public corporations is worse than in the case of JNR in terms of revenue over liabilities (see Exhibit 2-29), the situation should be improved.

Autostrade can sustain its financial soundness because it had suspended new construction when the economy was in recession in Italy in 1970s. The highway public corporations in Japan should also suspend their new construction and restructure their financial condition for the taxpayers' benefit and the future of national highway infrastructure in the long run.

5.2. Reform with Privatization

The possibility of financial reform is very limited without privatization because it is very difficult to suspend new construction with (1) the absence of financial discipline and (2) political interference. Privatization is necessary as a

problem-solving driver to change the present problematic situation. In this section, I will discuss how privatization helps to improve the situation.

5.2.1. Financial Discipline

Financial discipline consists of three major components: (a) public monitoring, (b) financial availability, and (c) financing flexibility.

Financial Monitoring

First, there is no public monitoring mechanism in the present system. As is described in 2.1.2, it is not necessary to get approval from the Diet or the congress in the local governments once the new construction is decided by the National Motorway Council and is ordered by the MLIT. From the public's point of view, however, some monitoring mechanism should be provided to them when the public corporations face a crisis, since they had to bear most of its debts after all. With privatization, financial markets offer an opportunity for investors to monitor the privatized enterprises. Shareholders monitor the companies, and the debt market also monitors them by credit rating. If they do not achieve financial soundness, they will get a penalty from the market and go bankrupt. Therefore, by opening their share to the public market, privatization is necessary as a tool to introduce a public monitoring system. Thus, incentive for making profit gets larger due to the pressure

from the shareholders, and it is possible to align the corporate mission and the public interest over financial soundness.

Financial Availability

Second, with the present system, debt financing is easily available and no financial discipline will be required by the public corporations. With government guarantee, the highway public corporations can get funding from financial institutions no matter how heavily they rely on debts and how much they are in a debt spiral. This is why they tend to depend on debts for new investment on construction. Also, JHPC gets less sensitive to debt issuance since the government subsidies JHPC for unprofitable routes when the interest rate becomes more than 3%. With privatization, the debt financing will get extremely difficult as long as they keep the present problematic financial situation. We can see the consequence that JHPC failed to issue FILP agency bonds of 85 billion yen in the end of FY2001 when Fiscal Investment and Loan Program is under reform by the Ministry of Finance. With small availability to get financed, the public corporations will be disciplined financially to get funding in future projects.

Financial Flexibility

Finally, there is little flexibility in financing their projects within the government's scheme. All they can do is to issue long-term debts with a fixed rate and with a government guarantee. On the other hand, private enterprises have

flexibility in getting funding. There are three drivers for the flexible financial market: (a) to collect funding whatever is available within scarce financing resources, (b) to minimize financing cost within that constraint, and (c) to hedge financial risks. Private enterprises have a portfolio of funding source to minimize financial cost and risk within an availability constraint. For example, since interest rates are sensitive over time, Autostrade has several combinations: a portfolio of short-term loans and long-term debts, and a portfolio of debts of fixed interest rate and floating rate. Also, they have a portfolio of domestic and foreign currency bonds to collect funding from any available sources. In another example, City Link of Melbourne issued convertible bonds to finance equity since they wanted to raise equity but equity financing was not available for them at the time (Walder, 1999). The privatized corporations are required to get financing with flexible methods to keep low financing costs.

5.2.2. Political Interference

Interference from politics and governments for new highway construction is very large and it affects the management of the corporations as is discussed in the previous section. From the public sectors' point of view, they need some mechanism to prevent such interventions when they need to keep themselves accountable to the public.

The privatization will have two kinds of effect on avoiding political interference: (a) interference from politicians or the government dramatically decreases due to the pressure from shareholders, and (b) autonomous management increases accordingly.

Pressure from Shareholders

First, with privatization, the government will be required to get an agreement for the privatized enterprises for political or governmental intervention since shareholders of the enterprises have a power to refuse it. The relationship between JRs and new Shinkansen investments give us a good example of how the government interference is avoided by JR companies. In this case, the government and JR companies know that debts to construct new Shinkansen cannot be repaid only by its operation. To keep JRs' financial soundness, they must have somebody else to own assets of Shinkansen, lease them with usage fee much lower than debt repayments, and still they have to discontinue the existing conventional line parallel to Shinkansen. Highways will have much larger investment plan in the future. Highway investment will total 18.4 trillion yen after 2000[88]. Shinkansen investment will be just 1.2 trillion yen (in 1995 yen) until 2018[89]. It is reasonable to think that the new highway investments have a similar situation, and the privatization forces the government to consider financial viability thoroughly.

---

[88] Source: Kato et al (2001), p.99

[89] MLIT, "*Shinkansen no Toriatsukai ni tsuite Seifu Yoto Goi* (in Japanese, Agreement about New Shinkansen Development between the Liberal Democratic Party and the National Government)," http://www.mlit.go.jp/tetudo/shinkansen/shinkansen6_kanren.html#goui , December 25th, 1996

Management Autonomy

Second, without government interference, the management of the public corporations will have an incentive to manage the corporations to make a profit by obtaining autonomy. The financial soundness of the public corporation can be achieved only through autonomous management of the corporation. The degree of intervention to build new highways is so large that it will turn the effort to solve financial problems without privatization in vain. JNR tried to restructure itself for four times before the privatization and all of them had failed, and this is a good example to know how big the impact of the interference is. Autonomy is essential to obtain sound management. Autonomy is categorized in two ways: (a) autonomy in corporate objectives, and (b) autonomy in management.

First, with government interference, objectives for the public corporations should be aligned with the government's mission, such as providing highways to rural areas or for the measures to boost the economy during recession. For the public corporations, this mission is much more important than to sustain financial viability. It is rather accepting the government's opinion than disagreeing with the government and managing the corporations autonomously simply because the public corporations need to get budget approval from the government with the present system. With privatization, however, corporate objectives will shift to profit making, and will be aligned with incentives of shareholders' as well as incentives of management and employees. The privatized enterprises will get the approval not

from the government but from shareholders' meetings, and the management objective will be concentrated in shareholders' satisfaction.

Second, without government interference, the autonomy will be improved in terms of human resources. In the present situation, most of management staff is from the government. For example, the president of JHPC is a former chief engineer of the former Ministry of Construction, and the president of MEPC is a former vice-governor of Tokyo Metropolitan government. Employees will be motivated and feel responsible by the fact that the president is elected from employees proper, not from the government.

Bureaucratic Failure

Because of the bureaucrat failure explained in Chapter 3, the public sectors are operated inefficiently. It comes from the absence of financial monitoring, the lack of management autonomy, and the lack of alignment between corporate objectives and profit making. As described before, the highway public corporations will have financial discipline and management autonomy by avoiding interference from politicians and the government as a result of privatization. Thus, the performance standard will be maximizing shareholders' benefits, not maximizing budgets or personal agendas. Inefficiency can be overcome as in the case of JNR, or efficiency will be increased as in the case of Autostrade, S.p.A.. Highway users can expect less operational costs, and thus less toll rates in the long run by efficiency improvement.

5.3. Form of Privatization

After the Japanese Prime Minister Koizumi prioritized the reform of the highway public corporations in his plan in the government administration reform, MLIT has created the *"Committee to discuss how to reform national highways."* The committee members are mainly from private sectors.

The committee compared and evaluated several forms of privatization. They are categorized into two main forms: (1) a privatized sector just operates highways and a public sector such as a government is an owner of highways (vertical separation), and (2) a privatized sector serves as an owner and an operator of highways (private ownership).

5.3.1. Vertical Separation

When the operator of an infrastructure does not own the infrastructure, it is called vertical separation. This method is often used in railways, such as railways in Sweden or new Shinkansen in Japan. There are three characteristics in this option: (1) under-investment in maintenance, (2) risk allocation, and (3) competition.

Under-investment in Maintenance

At first, there is a downside in infrastructure maintenance. Since operating costs become larger when infrastructure is maintained poorly, it is more reasonable for the operator to maintain infrastructure strategically to reduce operating costs.

When the operator does not own an infrastructure, however, the maintenance will be under-invested because of two reasons: (a) the operator cannot capitalize or depreciate maintenance cost, and (b) the operator needs permission from the owner for maintenance and the procedure will be complicated.

First, the private operator should register maintenance cost as an expense, and the operator's asset value will not be increased. Therefore, a large investment on asset improvement will affect the income statement, and an incentive for the operator will be lower with vertical separation. This is one of the reasons that Honshu JRs bought assets of existing Shinkansen from SHC, who owned assets of Shinkansen after the privatization of JNR (see 4.1.2).

Second, when the operator needs to get permission from the owner to maintain the owner's assets, this affects the autonomy of the private sector. It will be less flexible to invest on maintenance, especially large ones, since investments on maintenance affects the owner's assets.

This will be a big disadvantage for the improvement of a highway infrastructure. For this reason, the private sector should own some of the assets to run its business autonomously and efficiently.

Risk Allocation

Second, the merit of this method is that the operator just bears the risk of operation such as the risk of revenue fluctuation, and the financial risk of infrastructure investment can be allocated to the owner. Therefore, within this form

of privatization, the committee suggested that only the operating part be privatized and that the government owns the infrastructure for debt redemption. Thus, the risk will be small enough for the privatized sector to maintain its financial soundness.

There are two kinds of risk associated with owning highway assets: (a) the financial risk of redeeming debts for existing routes, and (b) the political risk of having new construction. In the private sector's point of view, both risks can be avoided without owning the infrastructure. The private sector is not in charge of redeeming existing debts, and also it can avoid political risk by agreeing with new construction only when leasing fee does not affect its financial condition. This is the scheme of developing new Shinkansen (see 4.1.3). JRCC is in charge of construction, it owns the assets of new Shinkansen, and JRs lease and operate it. The leasing fee is set not to affect the financial situation of JRs, and the government bears financial risk by funding to JRCC. The financial risk of new Shinkansen is so high that JRs want to lease them rather than own them even if maintenance costs cannot be capitalized.

Competition

Finally, there will be a competition for the concession since the operator can be anybody who can operate highways. There will be large amount of competitors when cash flow is attractive enough. The lowest bidder can get the concession if it is regulated to maintain a certain operational quality. The committee argues two different types of vertical separation: (a) the owner (the public sector) is in charge of

construction, and (b) the operator (the private sector) has a contract with the owner to build new routes.

In the first type, the concession period can be short. The incentive for the operator is to earn operating profit by reducing operating costs. Highway network can be divided into several areas to create opportunities and enhance competition. However, there is no incentive to reduce construction costs. Productive efficiency expected by privatization will be limited to the operation but not to the construction because government intervention will still remain, and because the owner will not be exposed to financial discipline. An incentive for the private operator is to reduce operating costs to increase net income since leasing fees are normally fixed and are not affected by revenues.

The second type is quite similar to Design-Build-Finance-Operate delivery method[90]. The concession period should be long enough to cover the initial construction period. However, the problem is that the construction costs of new routes are so high that they cannot be covered by profits of the operating private company. Therefore, it is very likely that the government will cover most of construction costs to maintain financial soundness of the private sector. When this happens, the operator has an incentive to build infrastructure that can reduce operating costs by design or by quality. This might also reduce life-cycle cost of the infrastructure.

---

[90] Design-Build-Finance-Operate (DBFO) is a delivery method in which the owner procures, from a single producer, design, construction, financing, maintenance, and operation of an infrastructure facility as an integrated whole. (Miller, 2000, p.50)

5.3.2. Private Ownership

The *"Committee to discuss how to reform national highways"* proposed two schemes as options for private ownership as well as private operation: (a) the private sector operates highways permanently, and (b) the private sector operates highways during the concession period with the government and transfer them to the governments after that (the case of Autostrade S.p.A, see 4.2). The committee concludes that the first option is not appropriate because roads will become private goods if the private sector owns them permanently. Roads should be public goods because of their characteristics of a natural monopoly, and this is why all the road projects that private sectors own have a concession to operate and transfer the ownership to the government after concession period.

There are several characteristics when a privatized sector owns and operates highway assets: (1) asset management will be more effective, (2) it can avoid political interference, and (3) financial situation will be worse if all debts that the highway public corporations are transferred to the privatized company.

Effective Asset Management

First, in contrary to the vertical separation, management of highway assets will be effective when the owner and the operator is the same entity. For the private sector, there is an incentive to minimize the life-cycle costs of the highway by

considering construction, maintenance and operating costs in total. In addition to the increase in productive efficiency of each cost by privatization, and the driver to decrease life-cycle cost will be much higher by the private ownership.

Avoiding Political or Governmental Interference

There are two kinds of interference: (a) coercion to construction new routes for political reasons, and (b) regulating operation by the government to minimize external diseconomy. For the first kind of intervention, interference for forcing new construction will be prevented, and this is a great advantage of this form of privatization from the private sector's point of view. There will be only little room for the politicians or the government to intervene with the management of the private sector since all the activities related with highways, such as ownership, operation and maintenance, are controlled by the private company for the sake of shareholders. Also, the second type of interference will be effectively imposed to the private sector with this form of privatization. Regulation will be imposed as a form of concession between the government and the private sector, and the degree of interference by regulation will be smaller than vertical separation. Thus, the autonomy of the private sector can be better maintained with the private ownership.

Worse Financial Situation

There are two problems associated with this form of privatization: (a) property tax, and (b) debt payment obligation.

First, property tax is a huge issue for the privatized highway owner. Property tax will be taxed on the private sector's highway properties and lands, and the private sector will not be exempted from this tax. JRs also pay property tax after privatization. Tax payment will devour the profit, and it will be very difficult for the privatized company to make a profit.

Second, debt redemption will be associated with assets, and the private sector will owe liabilities when it owns assets. The liabilities are so huge and the private sector by itself cannot bear all the financial risk with the liabilities. Moreover, as is described in 5.1.1, some assets owned by JHPC will produce only deficits during the redemption period and will not contribute to redeeming liabilities.

With these two financial problems, it will be very difficult for the privatized company to keep financial soundness without decreasing debts. Because of its huge leverage, the privatized sectors neither can list their shares on the stock market nor issue debts. Debts should be decreased, for example, by transferring to other entities such as JNR Settlement Corporation, where JNR's debts were transferred.

5.3.3. Suggestion for Privatization

By considering advantages and disadvantages of both vertical separation and private ownership, I suggest the combination of the two:

1. The privatized sector will own highway assets of profitable routes, and will be in charge of liabilities of profitable routes.

2. The public sector will own highway assets of unprofitable routes, and will be in charge of liabilities of unprofitable routes. The private sector will lease the assets of unprofitable routes from the public sector.
3. The private sector will pay property tax for the profitable assets. The government will create a special fund for redeeming liabilities of unprofitable routes funded by the private sector's property tax.
4. New construction will be basically suspended. Capital investment will be done to the degree that the leverage of the private sector is not affected. Otherwise, the government should construct new routes and the private sector will lease them.

With this scheme, there are several advantages:

(1) The private sector can avoid the disadvantage of having huge leverage by owning assets especially those of unprofitable routes. It is crucial to establish a viable financial situation for the privatized sector to avoid its bankruptcy. Its financial viability should be ensured in two occasions: (a) repayment of existing debts, and (b) the construction of new highways. For the operation, the government should bear some of the debts of existing public sectors to make debt payment feasible. For example, in the case of JNR, the JNRSC played a role to bear some of the debts of JNR by anticipating the sales of JNRSC's assets (see 4.1.2). In this suggestion, the government owns assets and bears debts associated with the assets, since JHPC has less assets to sell to the public than JNR, and therefore, this form is difficult to apply. For new routes, private sectors should not bear any risk associated

with new construction. In this suggestion, the government is going to build them and lease them to the private sector if the routes are socially necessary. By increasing financial viability in these two aspects, the possibility of bankruptcy can be decreased.

(2) Property tax will work as cross subsidies to unprofitable routes and it will not affect fairness by not being exempted from property tax. As is discussed in Chapter 3.3, some contributions from the government are necessary to give the private sector an incentive to operate unprofitable routes. In this scheme, the government contributes to the operation of unprofitable routes by government ownership and cross subsidies as a form of tax fund. Thus, the government can make sure that the private sector can operate unprofitable routes for social equity purposes.

(3) Political or governmental interference will not affect autonomy of the private sector. In this scheme, autonomy can be achieved by denationalization. Management can be away from control of the government when management objectives are aligned with shareholders' objectives. Also, in this scheme, the private enterprise will have a responsibility for highway operation as well when the public sector owns profitable routes. Gomez-Ibañez and Meyer (1993) argues that a company with too little of its own resources at risk may not always behave responsively. The risk can be introduced by the ownership. Also, managing assets will be much easier and autonomous with ownership of assets.

(4) There will be a serious discussion between the private sector and the public sector that reveals whether or not the specific routes are profitable . First of all, a serious discussion over traffic volume forecast will take place. The forecast cannot be optimistic since this determines every aspect of management. Second, a toll rate of profitable routes and a lease fee of unprofitable routes will be set carefully to promote incentive to the public sector, and they should not be too low at the same time. Regulation of the toll rate is very essential but very difficult to set because highway projects are capital incentive and the investment has a long life. Therefore, a discussion to determine toll rates should be very serious and specific.

5.3.4. Problems of Application

There are still two problems in the application for the privatization of the highway public corporations in Japan.

First, there should be additional values of privatization for the private sectors since the profit may not be sufficient just from the efficiency gain. The opportunity is limited in the privatization of highway operation. In the case of railroad, JRs have created values in or around the station, and made several investments to capture the values. For example, JR East now runs a franchise of station hotels. They made several hotels in the stations around Greater Tokyo Area and some Shinkansen stations. Also, it develops real estates near stations. The similar idea is applicable to the development of the service area or the lands near interchanges. However, the value will be less than railroad development because the population movement is

less sensitive to the highway development than to the railroad development at least in Japan. Autostrade created the value of network by installing fiber optics along highways. In Japan, however, the fiber optics networks along the highway has already experienced a competition between the fiber optics networks along the railway, and lost the competition. Therefore, the success in Autostrade is not applicable to Japanese highways.

One of the possible value creations is to sell information of the highway operator to the public. Since vehicle detectors are installed every 200m in urban expressways, for example, a huge amount of traffic data is collected every minute. This information can be used to analyze the present traffic condition and to forecast the future congestion. Currently, the data is given to the Japan Road Traffic Information Center for free, but these data can be sold after privatization.

Second, the externality still remains as a disadvantage for the private sector. As mentioned in Chapter 3.3, the privatization is more difficult where externality problems, especially environmental issues, are major concern. This is the case in most highway projects, even in maintenance or reconstruction projects. The government involvement may be necessary at the time of reconstruction or maintenance of the highways owned by the private sector if the externalities are large. This topic should be analyzed in the further research with experiences of Autostrade or other private sectors in the world.

Chapter 6. Conclusion

In order to identify highway development framework in Japan and to develop the best strategy for the privatization of the highway public corporations, this thesis examines the development system of highway in Japan in Chapter 2, and introduces the characteristics of public sectors and the effects of privatization especially denationalization in Chapter 3, as the background. Chapter 4 analyzes two case studies relevant to privatization of public sectors which own and operate highway infrastructure. Based on the background and the findings from the case studies, Chapter 5 argues the effect of privatization for solving serious problems in highway public corporations, in the context of their financial crisis under rapid expansion of toll road system mostly by debt financing. A framework for privatization of Japanese highway public corporations are also addressed in Chapter 5, with regard to the viable types of ownership structure, including private ownership and vertical separation. Through the process above, this thesis reached the following four main conclusions.

Conclusion 1. The highway public corporations in Japan are in a critical situation financially.

Under the rapid expansion of highway system throughout the country mostly by debt financing, the revenues of highway public corporations are eaten up by interest expense, and the public corporations themselves are in a debt spiral. When there is a decrease in government support under financial and administrative reforms in Japan, it is necessary to restructure the financial system of highway development, as well as the development of strong initiative to avoid political interferences.

Conclusion 2. Denationalization has three effects as a problem-solving driver for public sectors: increase in productive efficiency by the incentive for profit maximization, improvement in financial soundness of debt financing, and the prevention of interferences by politics and government.

First, by denationalization, productive efficiency will be increased. The objective of privatized sectors is to maximize the profit of their own shareholders, while the budget maximization was the management objective for the public sectors. Failure to satisfy their shareholders ends up with the decline in share value, and this monitoring function is an incentive to satisfy shareholders. Therefore, the objectives of shareholders, management, and employees are much easier to get aligned, and thus productive efficiency will be increased.

Second, denationalization requires financial soundness of the firm without government support. Debt financing is critical in this situation, and high reliance

on debt and the continuous increase of debt outstanding is not acceptable for the capital market. Therefore, the sound capital structure is critical for the privatized firm. Failure to satisfy market conditions brings a penalty of default to the firm.

Third, denationalization can be a strong incentive to reject political interferences. The firm's objective and the social objective can be completely separated to satisfy economic profit of shareholders. The ambiguity will be diminished, and the economic and social objective will be clearly separated. Thus, the autonomy of the management toward economic objectives will be increased and will not be interfered.

Conclusion 3. A combination of private ownership and vertical separation is suggested to achieve denationalization most effectively.

To apply denationalization specifically to Japan Highway Public Corporation, a combination of private ownership and vertical separation will obtain the most effective achievement of denationalization. Productive efficiency will be obtained by denationalization itself, financial soundness will be improved by owning just profitable routes, and autonomy for efficient asset management will be maintained by being in charge of both owning and operating for key profitable routes. This suggestion definitely affects new construction of planned routes. This social objective to complete developing all the planned routes should be separated from debt-financed projects, and the government should develop it

and lease it to the privatized sector, if necessary. The lease fee will be determined to the extent that does not affect the financial soundness.

Conclusion 4. The privatization has a disadvantage when externalities such as environmental issues are major concern.

The private sector has a flexibility to compromise environmental issues to avoid financial costs of delays. When environmental issues are major concern for the projects, however, the private sector may avoid or abandon controversial projects since it is difficult to satisfy all the interests by mutual agreements. In this case, it may be necessary for the public sectors to get involved in solving these conflicts with their established authority and procedures. The relationship between the private and public sectors should be clearly defined to balance the autonomy of the private sectors and the authority of the public sectors.

Bibliography

Autostrade S.p.A. Annual Report 2000,
http://www.ir.autostrade.it/bilancio_ing/bilancio2000_ing/bila_00_ing.zip

Autostrade S.p.A. Annual Report 1999,
http://www.ir.autostrade.it/bilancio_ing/bilancio99_ing/bil_engl.zip

Autostrade S.p.A., Autostrade Group Business Plan 2001-2005,
http://www.ir.autostrade.it/presentazioni_ing/index.htm, December 2001

East Japan Railway Culture Foundation, "The Privatization of Railways in Japan – An Outline of Splitting up and Privatizing the Japanese National Railways," 1995.

Fiscal Reform Subcommittee, Ministry of Finance in Japan, "*Hokokusho – Minkan Kigyo to Doyo no Kaikei Shori niyoru Zaimu Shohyo no Sakusei to Gyosei Cost no Kaiji*, (in Japanese, The Report for Making of Financial Statement using an Accounting Method for Private Enterprises and Disclosure of Governmental Cost)," http://www.mof.go.jp/singikai/zaiseseido/siryou/zaiseic130619a.pdf, June 2001

Fukui, Koichiro, "Japanese National Railways Privatization Study, The Experience of Japan and Lessons for Developing Countries," World Bank Discussion Papers, No. 172, The World Bank, 1992

Fukui, Koichiro, Nakamura, Kiyoshi, Ozaki, Tsutomu, Sakamaki, Hiroshi, and Mizutani, Fumitoshi, "Japanese National Railways Privatization Study II: Institutionalizing Major Policy Change and Examining Economic Implications," CFS Discussion Paper Series, The World Bank, December 1994

Gomez-Ibañez, Jose A. and Meyer John R. "Going Private, The International Experience with Transport Privatization," The Brookings Institution, Washington, DC, 1993

Hemming, Richard and Mansoor, Ali M. "Privatization and Public Enterprises," International Monetary Fund, Washington D.C., January 1988.

Hanshin Expressway Public Corporation, "*Gyosei Cost Keisansho ni tsuite* (in Japanese, the Statement of Governmental Costs) for FY2000," Press Release, http://210.155.83.178/news/kiji/pdf/cost-a.pdf, September 2001

Hanshin Expressway Public Corporation, "*Hanshin Kosoku Doro Kodan no Kessan* (in Japanese, Financial Statement of Hanshin Expressway Public Corporation) for

FY1999," Press Release, http://210.155.83.178/news/kiji/20000831-2.html, August 2000

Honshu Shikoku Bridge Authority, "*Honshu Shikoku Renrakukyo Kodan no Gyosei Cost Keisansho ni tsuite* (in Japanese, the Statement of Governmental Costs of HSBA) for FY2000," Press Release, http://www.hsba.go.jp/h12gyo-cst/index.htm, September 2001

Japan Highway Public Corporation, "*Ryokin ya Hutan no Kangaekata* (in Japanese, The Concept of Toll Rates and Allotment)," http://www.jhnet.go.jp/faq/faq00b.html, April 2002

Japan Highway Public Corporation, Annual Report 2001, http://www.jhnet.go.jp/english/annual.pdf

Japan Highway Public Corporation, Highway Report 2000

Japan Highway Public Corporation, "*Nempo* (in Japanese, Annual Report) 2001"

Japan Highway Public Corporation, http://www.jhnet.go.jp/faq/keigen.html, March 2002

Japan Highway Public Corporation, "*Kousoku-doro no Shoukan-keikaku to Jisseki no Taihi*, (in Japanese, The comparison between the redemption plan of Highways and the Actual Data.)," http://www.jhnet.go.jp/press/rel/2001/08/31/netten4.html

Japan Highway Public Corporation, "*Gyosei Cost Keisansho ni tsuite* (in Japanese, the Statement of Governmental Costs)," Press Release http://www.jhnet.go.jp/press/rel/2001/09/28/, September 2001

Japan Highway Public Corporation, "*Tokyo-wan Aqua Line Jigyo Jigo Hyoka Chukan Hokoku*, (in Japanese, the Report about the Evaluation of Tokyo Bay Aqua Line Project)," http://www.jhnet.go.jp/about/act/proj/report/03.html, December 1999

Japan Railway Construction Corporation, "*Seibi Shinkansen no Gaiyo*, (in Japanese, the Outline of New Shinkansen Development)," http://www.jrcc.go.jp/sigoto/sigoto1.htm, January 2002

Japan Railway Construction Corporation, Japan National Railways Settlement Headquarters, "*Kokutetsu Seisan Jigyo Honbu* (in Japanese, Japan National Railways Settlement Headquarters)," http://www.jnrsh.gr.jp/kouzou/kouzou.html, February 2002

Japan Railway Construction Corporation, Japan National Railways Settlement Headquarters, "*JR Kabushiki no Shobun* (in Japanese, a Clearance of JR Stock)," http://www.jnrsh.gr.jp/kabushiki/kabushiki.html, February 2002

JR Central (Central Japan Railway Company), Annual Report 2001, http://www.jr-central.co.jp/info_e.nsf/c_info2/882531F3DA48517549256AD50014BF19

JR East (East Japan Railway Company), Annual Report 2001, http://www.jreast.co.jp/e/investor/finance/pdf/ar2001/ar2001_e.pdf

JR West (West Japan Railway Company), Annual Report 2001, http://www.westjr.co.jp/english/english/company/con02/ar/2001/index.htm

Kasai, Toshiyuki, "*Mikan no Kokutetsu Kaikaku* (Unfinished Reform of JNR)," Toyo Keizai, Inc., 2001

Kato, Hideki and Japan Initiative, "*Nihon Doro Kodan Kaitai Plan* (Japan Highway Public Corporation Dissolving Plan)", 2001

Liddle, Brantley T., "Sustainable Development, Infrastructure and Environmental Investment, and the Privatization Decision," Thesis, Massachusetts Institute of Technology, 1993

Mainichi Shinbun, "*Kyu Kokutetsu Choki Saimu Shori Ho Seiritsu* (in Japanese, the Law for the Disposal of Former-JNR's Long-term Debts was legislated)," http://www.mainichi.co.jp/eye/feature/article/digital/26/26_6.html, October 22, 1998.

Matsui, Yasuyuki. "Feasibility of Privatization of Expressway in Japan," Thesis, Massachusetts Institute of Technology, January, 1993.

Metropolitan Expressway Public Corporation, "The Tokyo Metropolitan Expressway," 2000

Metropolitan Expressway Public Corporation, "MEX," 2000

Metropolitan Expressway Public Corporation, "*Gyosei Cost Keisansho* (in Japanese, the Statement of Governmental Costs) for FY2000," Press Release, http://www.mex.go.jp/press/011001/index.html, Oct. 1st 2001

Metropolitan Expressway Public Corporation, "*Zaito Kikansai 'Dai Ikkai Shuto Kosoku Doro Kodan Saiken' no Toshikamuke Setsumeikai* (in Japanese, the

Explanatory Meeting for the Investors of the FILP Agency Bonds, the 1st MEPC Bonds)," Press Release, February 2002

Midland Expressway Limited, http://www.bnrr.co.uk/home.htm, January 2002

Miller, John B., Principles of Public and Private Infrastructure Delivery, Kluwer Academic Publishers, 2000

Ministry of Finance in Japan, FILP Report 2001, http://www.mof.go.jp/zaito/zaito2001e/zaito2001e.htm, November 2001

Ministry of Finance in Japan, FILP Report 2001, Extension Volume, Policy Cost Analysis of FILP Projects, FY2001, http://www.mof.go.jp/english/zaito/zaito2001e-exv/exv-index.htm, December 2001

Ministry of Finance in Japan, FILP Report 2000, http://www.mof.go.jp/zaito/zaito00e.html, February 2001

Ministry of Land, Infrastructure and Transport, "*Doro Kankei Kodan no Gaiyou* (in Japanese, the Outline of the Highway Public Corporations)," http://www.mlit.go.jp/road/ir/hyouka/kodan/gaiyo/gaiyo.html, December 2001

Ministry of Land, Infrastructure and Transport, "*Kosoku Jidosha-do no Seko-meirei ni tsuite* (in Japanese, the Construction Order to JHPC)," http://www.mlit.go.jp/road/press/press0/12-22.htm, December 1997

Ministry of Land, Infrastructure and Transport, "*Doro Tokutei Zaigen ni kansuru Data-shu* (in Japanese, Data about Road Improvement Special Account)," http://www.mlit.go.jp/road/zaigen/zaigen.htm, March 2001

Ministry of Land, Infrastructure and Transport, "*Kosoku Jidousha Kokudo no Seibi/Kanri no Arikata ni kansuru Hokoku* (in Japanese, the Report of the Reformation of National Highways)," http://www.mlit.go.jp/road/singi/001215/001215-2b.html, December 2000

Ministry of Land, Infrastructure and Transport, "Financial Plan," http://www.mlit.go.jp/road/road_e/finance/, January 2001

Ministry of Land, Infrastructure and Transport, "*Shinkansen no Toriatsukai ni tsuite Seifu Yoto Goi* (in Japanese, Agreement about New Shinkansen Development between LDP and the National Government),"

http://www.mlit.go.jp/tetudo/shinkansen/shinkansen6_kanren.html#goui , December 25th, 1996

Ministry of Public Management, Home Affairs, Posts and Telecommunications, "*Kosoku Doro ni kansuru Gyosei Kansatsu Kekka ni motozuku Kankoku* (in Japanese, the Written Advice based on the Result of Inspection of the Administration about Highways)," http://www.soumu.go.jp/kansatu/koukikaku.htm, August 8th 2000

Roberts, Michael J., "Valuation Techniques," Harvard Business School, 9-384-185, 1988

Standard & Poor's, "*Kouteki Sector Kakuzuke List* (in Japanese, the List of the Rating Public Sector)," http://www.standardandpoors.com/japan/ratingactions/rating_list/print7.html

The Road Council, The Road Council, "*Doro Shingikai Chukan Toshin* (in Japanese, the Report for What the Future of Toll Road System Ought to Be)," November 1995

The World Bank, and Ministry of Construction, Japan, "Asian Toll Road Development Program, Review of Recent Toll Road Experience in Selected Countries and Preliminary Tool Kit for Toll Road Development," May 1999

Transurban City Link Limited, Annual Report 2001, http://www.transurban.com.au/content/transurban/FinAR2001.pdf

Vickers, John and Yarrow, George. "Economic Perspective on Privatization," The Journal of Economic Perspective, Volume 5, Issue 2, Spring 1991.

Walder, H. "The Melbourne City Link," Kennedy School of Government Case Program, CR14-99-1539.0, Harvard College, 1999

407 International Inc., Consolidated Financial Statements, Jan. 18th 2002