Working Paper

South Korea - Potential Market for Russian Logs

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FOREWORD

Siberia's forest sector is a topic which recently has gained considerable international interest.

IIASA, The Russian Academy of Sciences, and the Russian Federal Forest Service, in agreement with the Russian Ministry of the Environment and Natural Resources, signed agreements in 1992 and 1994 to carry out a large-scale study on the Siberian forest sector. The overall objective of the study is to focus on policy options that would encourage sustainable development of the sector. The goals are to assess Siberia's forest resources, forest industries, and infrastructure; to examine the forests' economic, social, and biospheric functions; with these functions in mind, to identify possible pathways for their sustainable development; and to translate these pathways into policy options for Russian and international agencies.

An important component within this framework is to understand the market potential for Russian wood on the international market. This report dealing with the market potential for Russian wood in South Korea has been carried out by Kwang-Il Tak during his working stay at IIASA supported by the Ministry of Industry, Canada.

ABSTRACT

Korea with its over 40 million population and small forest land base relies heavily on imports for its wood consumption. Korea is usually the second largest log importer in the world after Japan. Since the worsening importing conditions in the traditional log suppling countries, Korea has always looked for alternative supply sources which could provide logs with better conditions. The Russian Far East has emerged as a new source of supply which could meet the conditions Korea looks for since Korea established diplomatic ties with the former Soviet Union in 1990.

The purpose of this paper is to help Russian forest sector best prepared for Korean market, since Korean market is relatively new to Russia but the market is growing and has a large potential for Russian logs. This paper includes two major parts: Korean forest sector and market potential for Russian logs in Korea. In the first, Korean forest sector is introduced of its resource base, demand and supply structure, and forest product industries. In the second part, Korean market is analized for characteristics of the market, imports of Russian logs, Russian logs substitutability for competitor logs, and limiting factors to increase the exports to Korea. This paper attempted to project an outlook of Russian log imports to Korea by year 2000 based upon three price scenarios.

This paper concludes that growing wood consumption in Korea and Russian logs superior wood properties to competitor logs will positively affect the outlook of using Russian logs in Korea. This paper also indicated that unification of two Koreas will be another positive factor to increase the level of imports of Russian logs to Korea.

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1. INTRODUCTION

Korea has been one of the fastest growing economies in the world for the last three decades. Due to its rapid economic growth, Korea is now one of the four leading Newly Industrialized Economies (NIEs) in Asia together with Hong Kong, Singapore, and Taiwan. Korea, however, is poorly endowed with natural resources. Naturally, a labour-intensive and export-oriented industrial structure was established in the early stages of development.

Interestingly, the forest industry in Korea, which lacks forest resource base to support itself, has greatly contributed to the country's export industry and in turn the country's economic development. The dominant pattern of the forest industry in the 1960s and 1970s was importing hardwood logs from South East Asia and exporting mainly to North American markets after processing them into a low-value bulky product such as plywood. The forest industry and exports of forest products continued to grow throughout the 1970s. The trend, however, was halted in 1980 by a log export ban in Indonesia, the major supplier of hardwood logs. Although exports of forest products have sharply declined since 1980, Korea has continued to import a large amount of logs for its growing economy, now mainly for domestic use.

In the Korean forest industry's development during the last three decades, one consistent pattern has been the industry's various efforts to secure a timber supply through a continuous search for new supply sources. Simple imports from local suppliers were the main means of getting the raw material. However, some imports have resulted from Korean logging investment in the supplying countries (Office of Forestry, 1992). In other words, Korea's forest industry was involved in production activities across national boundaries early in its development. Korea also used the imported natural resources for hard-currency-earning exports. This is how and why Korea's forest industry became internationalized well ahead of other industries in Korea. In fact, Korea's first outward foreign direct investment happened to be a forestry venture in Indonesia in 1968 (Euh and Min, 1986).

Now the Russian Far East has emerged as a new wood supply source to Korea since a direct investment was undertaken in the region in the form of a JV by Hyundai in 1990. The close geographic location from Korea and the vast stock of forest resources in the Russian Far East suggest that this region could grow to become one of the major timber supply sources to Korea.

The purpose of this paper is to identify the characteristics of Korean forest sector and other economic environment as a home country investing in the Russian Far East as well as a market for Russian logs. Furthermore, it identifies the competitive environment which Russia faces to become a major supplier of wood materials to Korea. Potential strategies for the Russian forest industries to increase the exports to Korea are suggested.

2. THE NATIONAL ECONOMY

Korea's economy is in a critical condition now, as the country stands on the threshold of becoming a major world economic power. While a wide gap still exists between it and a country like Japan, Korea is being chased by China and the NIEs from Southeast Asia. Growth seems to have lost momentum. Social unrest has emerged as the price to be paid for remarkably rapid economic success in the past and for its continuation in the future. The purpose of this section is to overview the current state of the country's economy.

Korea is a small country with a poor endowment of natural resources. A small land area and a large population have been additional constraints on the development of its economy. The fragile economy which existed following cessation of hostilities in 1945 was completely dismantled by the Korean War from 1950 to 1953 and had to be rebuilt from the ashes of the war. However, the economy has grown very rapidly under the control of the strong authoritarian government and its outward-looking economic policy since the early 1960s. The average annual growth rate was nearly 9% for the period from 1962 to 1991. Per capita income grew 80 times in this period. Trade volume was US$153.4 billion in 1991, up from US$477 million in 1962. Average annual growth in exports was about 40% for the period from 1962 to 1979. Average annual growth in trade was the world's highest, 22.5%, for the period from 1970 to 1987 (Kim, 1990). Korea became the world's 14th largest economy and 10th largest trading nation in 1991. Korea ranks among the 4 leading NIEs.

One index showing how quickly Korea has been industrialized is the Hoffman index[1]. A highly industrialized country has a ratio of less than 0.5 (Oh, 1993). Korea reached a ratio of 1.0 in 1977. It took over 100 years for England, Germany and U.S.A to reach this ratio, 30

[1] The index is, roughly, the ratio of light industry to heavy industry. Light industry here is defined as those manufacturing industries which produce consumer goods, whereas heavy industries produce capital goods. Among the former are food, textile and wood product industries, while the latter produce chemicals, metals, and fabricated metal and machinery. When the ratio is less than one, the country can be called industrialized (Oh, 1993).

Table 2.1. Major Korean Economic Indicators

			Trade		
	GNP Growth	GNP per Capita	Export	Import	Trade Balance
Year	(%)	(US$)	(US$ billion)		(US$ billion)
1981	5.9	1,734	20.7	24.3	-3.6
1982	7.2	1,824	20.9	23.5	-2.6
1983	12.6	2,002	23.2	25.0	-1.8
1984	9.3	2,158	26.3	27.4	-1.1
1985	7.0	2,194	26.4	26.5	-0.1
1986	12.9	2,505	33.9	29.7	4.2
1987	13.0	3,110	46.2	38.6	7.6
1988	12.4	4,127	59.6	48.2	11.4
1989	6.8	4,994	61.4	56.8	4.6
1990	9.3	5,659	63.1	65.1	-2.0
1991	8.4	6,518	69.6	76.6	-7.0
1992	4.7	6,749	75.1	77.3	-2.2

Source: Bank of Korea (1993b)

or 40 years for Japan, and only 14 years for Korea (Watanabe, 1982). Korean industry reached a ratio of 0.5 in 1991 (Oh, 1993).

Besides these statistics, there are several symbolic examples illustrating the success of the country's economy. Hosting the 1988 summer Olympic Games and exporting brand-name cars and high-technology consumer electronic products to the world's major markets are among these. In addition, joining the OECD (Organization for Economic Cooperation and Development) by the mid 1990s is being seriously considered by the government[2].

Table 2.1. shows that the climax of Korea's march to success was the three year period from 1986 to 1988, when the growth in GNP continuously was over 10%. For the first time since 1977, the trade balance shifted to surplus, peaking at US$11.4 billion in 1988. However, growth suddenly slowed in 1989. The economy grew 6.8% that year, the slowest since 1981. Subsequently, export growth continued to decline from 1989 with the trade balance turning back to deficit in 1990.

During the three year period from 1986 to 1988, a favorable external economic environment enabled Korea to keep its economy growing at a high rate. Especially important were the low

[2] Reported on *Hankuk Ilbo* dated April 19 and 20, 1991, published in the Korean language in Canada.

Table 2.2. Share of GNP by Industry (%)

Year	Primary	Secondary	Tertiary
1960	36.8	20.0	43.2
1970	26.0	29.2	44.9
1980	14.9	41.4	43.8
1985	12.9	41.8	45.4
1990	10.0	49.5	40.5
1991	8.7	50.7	40.6
1992	8.4	49.3	42.3

Source: Bank of Korea (1993a)

international interest rates, low oil prices, and low ratio of the US dollar to the Japanese yen, known as the three lows. The low oil price and international interest rates boosted the world economy, which helped Korea increase its exports. The appreciation of the Japanese yen also contributed to the growth in Korean exports.

As Koo (1993) pointed out, the 1986-1988 boom did not originate from a solid competitive advantage of the nation in the world market. External conditions became favorable and Korea simply benefited from them. Once external conditions went into recession, the bubble of economic growth soon burst.

Table 2.2 shows that as Korea has become more industrialized, there has been a shift from primary to secondary and tertiary industry. In 1960 Korea was still an agrarian society with primary industry accounting for as much as 36.8% of total GNP. That share had gone down to 8.4% by 1992. On the other hand, secondary industry rose to 49.3% in 1992 from 20% in 1960. The tertiary industry's share has been largely maintained for this period. A similar shift took place in employment in each of these industries, which means that a large number of farmers migrated to manufacturing or service industries.

Now, high labour cost has made Korea unable to compete with China and the new NIEs in the world's export markets. In other words, Korea's competitive edge based upon labour intensive industry has largely been blunted. The relocation of domestic production facilities to other countries where inexpensive labour is available has been taking place rapidly for several years. In addition, Korea's market share in North America and Europe has been eroded by competitors armed with inexpensive labour. Furthermore, the level of Korean technology is not high enough to compete in highly industrialized markets. Raw material sources also need to be diversified to provide a stable supply of raw materials required to feed the ever-growing domestic economy.

Table 3.1. Land Classification in Korea in 1990

Land Classification	Area (1,000 ha)	Share (%)
Forested Land	6,476	65%
stocked	(6,285)	(97%)
unstocked	(174)	(3%)
unsurveyed	(16)	(0%)
Farm Land	2,109	21%
rice paddies	(1,345)	(64%)
upland fields	(764)	(36%)
Others	1,342	14%
Total	9,927	100%

Source: Forestry Administration (1991)

Currently, there are five major goals for the Korean economy, if it is to continue to grow. These include expanding existing trade markets, developing technology, ensuring a stable supply of raw materials, restructuring industry, and diversifying trade partners (Kim, 1991). The former USSR, China, and the East European countries have emerged as new markets which could help Korea achieve part of these goals, and in the case of raw material supplies, the former USSR has emerged as a potential supplier of wood raw material.

3. FOREST SECTOR

3.1. Forest Resources in Korea

Korea is a small country: merely 99,270 square kilometers, or about one tenth of the size of British Columbia, Canada, or three times the size of Vancouver Island. But the country is highly populated. The estimated population as of 1990 is 42.9 million and population density is 431.8 persons per square kilometer. With Korea, located between 34 and 38 degrees in latitude, most of it belongs to the temperate zone except for some subtropical areas in the southern coastal region and Cheju Island in the southernmost part of the country. About 64% of the land is mountains, where most of the country's trees are found. The total forested area, shown in Table 3.1, is 6.48 million hectares, or 65% of the total land area (Forestry Administration, 1991).

Table 3.2. shows forested area and volume by forest type. Coniferous forest is the major type of forest covering 3.1 million hectares, or 49% of the stocked forested area. Non-coniferous forest accounts for 1.4 million hectares, or 22% of the stocked area. Mixed forests occupy 1.8 million hectares, or 29% of the stocked area, and the remaining nearly 8 thousand

Table 3.2. Stocked Forest Types in 1990

Forest Type	Area (ha) millions	Growing Stock Volume (m^3) millions
Coniferous Forests	3.1	114
	(47.5%)	(45.8%)
Non-coniferous	1.4	65
Forests	(21.5%)	(26.0%)
Mixed Forests	1.8	70
	(27.9%)	(28.2%)
Bamboo	<0.1	-
	(0.1%)	-
Total	6.3	248

Source: Forestry Administration (1991)

hectares are covered with bamboo stands. Total growing stock volume of the forests in Korea is 248 million cubic meters. Coniferous forests have the largest share, 114 million cubic meters (46% of total), followed by mixed forests, 70 million cubic meters (28%) and non-coniferous forests, 65 million cubic meters (26%).

The forested land is classified into three types of ownership: national government, local governments at the provincial and district levels, and private ownership. As shown in Table 3.3, national forests account for 21% of the forested land. Over two thirds of the forested area is under private ownership. Public forest land accounts for only 8% of the total. However, the growing stock volume is not proportional to the share of forested area. Whereas the national forests have a larger volume to area ratio, the private forests have a smaller ratio.

Table 3.3. Forest Ownership in 1990

Ownership	Area (ha) millions	Growing Stock Volume (m^3) millions
National Forests	1.3	85
	(20.8%)	(34.3%)
Public Forests	0.5	18
	(7.6%)	(7.3%)
Private Forests	4.6	145
	(71.4%)	(58.4%)
Total	6.4	248

Source: Forestry Administration (1991)

Table 3.4. Growing Stock Volume per hectare in Various Countries

Countries	Growing Stock Volume per ha (m^3)
Korea	40
Japan	113
United States	78
Canada	183
(British Columbia)	(241)
Russian Far East	75
(Primorskiy Kray)	(157)

Source: Compiled from Forestry Administration (1991), Noorin Tookei Kyookai (1993), Forestry Canada (1990), Sheingauz *et al.* (1989)

Although 65% of the total land is forested, the growing stock volume per hectare is very low compared to those of other countries as in Table 3.4.

Many reasons can be attributed to such a low growing stock volume of the forests in Korea. The climate and soil conditions of Korea, for example, are not very hospitable to the growth of forests. The climate is characterized by a hot and moist monsoon summer and a cold and dry continental winter. Granite and gneiss comprise more than 70% of all the parent material. Due to the changeable continental climate and especially torrential rains in summer, the soil is susceptible to rapid erosion. Most of the forest soil is acidic sandy loam (Forestry Administration, 1992a).

However, the most important reason is the poor age class structure as shown in Table 3.5. The majority of the present forests were established through a massive reforestation effort launched in the early 1960s. Korean forests had been heavily exploited to supply the war economy during the Japanese colonial period. Again, the forests were almost completely destroyed during the Korean War from 1950 to 1953. By 1952, total growing stock volume

Table 3.5. Age Class Structure in 1990

Age Class (years old)	Area (1,000 ha)	Share (%)	Volume (mil. m^3)	Share (%)
Under 20	4,403	68	106	43
Under 40	1,914	30	123	49
Over 41	159	2	19	8
Total	6,476	100	248	100

Source: Forestry Administration (1991)

had been reduced to 36 million cubic meters and the average growing stock volume per hectare plummeted to as low as 5.6 cubic meters per hectare (Forestry Research Institute, 1985). The fact that the growing stock has now recovered to 40 cubic meters per hectare is mainly due to the reforestation of the last 30 years. However, the age class structure is skewed towards young and immature forests. The age class under 20 years accounts for 68% of the forested area and 43% of the volume. Forests under 40 years represent 98% of the area and 92% of the volume.

A poor ownership structure also helps explain the low growing stock volume of the forests in Korea. The 4.6 million hectares of private forests, or 71% of total forest land, is owned by 3 million owners (Forestry Administration, 1991). The average forest area per owner is only 1.5 hectares. Many of these small woodlots are owned for other purposes than productive forest management such as for keeping ancestral tombs. 96% of private owners own less than 10 hectares of forest. This ownership structure prevents the forests from being managed to achieve scale economies.

3.2. Demand and Supply

As in other countries, wood is one of the indispensable basic materials for economic activities in Korea. Wood demand in Korea has grown rapidly with the Korean economy during the last three decades. Table 3.6 shows that consumption had risen to 9.4 million cubic meters by 1990 from 2.8 million cubic meters in 1968, i.e. at an average rate of 6.5% a year. More than half of the wood demand was derived from booming plywood exports between the late 1960s and the late 1970s. The share of demand derived from exports peaked at 65% in 1976. The export-oriented wood consumption pattern changed to a more domestic-oriented pattern as the domestic economy grew. Therefore, the internalization of wood consumption went up from 43% in 1969 to 97% in 1990. At present, then, virtually all wood demand is derived from domestic consumption.

On the supply side, the limited land base and growing stock in Korea could not meet the soaring wood demand boosted by the economic growth of the country. Indeed, the average annual share of domestic wood supply between 1968 and 1990 was only 16% of total timber demand. Domestic wood supply has increased by only 43% from 0.8 million cubic meters to 1.1 million cubic meters for the period from 1968 to 1990. For the same period, total demand has gone up by 3.4 times from 2.8 million cubic meters to 9.4 million cubic meters. The consequent gap has been filled by imports, and the self-sufficiency ratio thus declined to 12% from 28% during the same period (Table 3.6).

Table 3.6. Wood Consumption and Supply

	----------Consumption----------				----------Supply----------				
	Total	Domestic	Export	RDC*	Total	Domestic	Import	Self-Supply	Balance**
Year									
1968	2,810	1,550	1,260	55	2,810	800	2,010	28	0
1969	3,534	1,510	2,024	43	3,534	884	2,650	25	0
1970	4,000	1,713	2,287	43	4,000	845	3,155	21	0
1971	5,060	2,192	2,868	43	4,772	1,016	3,756	21	-288
1972	5,348	2,293	3,055	43	4,949	782	4,167	16	-399
1973	6,412	2,782	3,630	43	5,945	943	5,002	16	-467
1974	6,356	2,873	3,483	45	5,799	969	4,830	17	-557
1975	6,465	2,889	3,576	45	6,015	896	5,119	15	-450
1976	7,825	2,700	5,125	35	7,266	943	6,323	12	-599
1977	9,817	4,406	5,411	45	8,834	1,027	7,807	10	-983
1978	11,611	6,346	5,265	55	10,423	996	9,427	9	-1,188
1979	10,940	6,616	4,324	60	10,038	952	9,086	9	-902
1980	7,750	5,785	1,965	75	7,149	1,008	6,141	13	-601
1981	7,265	4,585	2,680	63	6,688	1,130	5,558	16	-577
1982	7,417	5,661	1,756	76	6,772	1,157	5,615	16	-645
1983	8,302	6,340	962	76	7,625	1,101	6,524	13	-677
1984	7,472	6,727	745	90	6,891	1,118	5,773	15	-581
1985	7,321	6,792	529	93	6,766	1,188	5,578	16	-545
1986	7,582	6,996	586	92	7,014	1,242	5,772	16	-568
1987	8,532	7,816	116	92	7,850	1,388	6,462	17	-682
1988	8,565	8,153	412	95	8,565	1,246	7,319	15	0
1989	9,014	8,448	566	94	9,014	1,227	7,787	14	0
1990	9,423	9,121	302	97	9,423	1,138	8,285	12	0

* RDC represents the ratio of domestic consumption and indicates the importance of domestic market.

**Balance: The difference between total demand and supply from 1971 to 1988 is caused by the omission of recycled wood from the total supply.

Source: Forestry Administration (1991)

As alluded to earlier, domestically produced timber has a small diameter and low quality and is therefore suitable only for mine-props and pulping. This limited use even more restricts the contribution of domestic timber. This situation has forced Korea to remain an absolute timber deficit country. The government has an ambitious plan to increase the self-sufficiency ratio from the current 12% to 51% in 2030 and 60% in 2080 (Forestry Research Institute, 1991). However, judging from the self sufficiency ratio over the last 20 years, it is doubtful whether the plan can be realized. The average annual growth rate of timber demand for the period from 1968 to 1990 was 6.5%. This rate far exceeds the growth rate of domestic timber supply for the same period, 2.1%. If this situation continues, which is most likely, the self-sufficiency ratio will fall further, contrary to the government plan. Japan has already gone through the same experience. Its self-sufficiency level has gone down to 25% in 1991 from 87% in 1960 (Noorin tookei kyookai, 1993). It is expected that Korea will have to continue to rely on imports to meet the rising domestic demand.

3.3. Log Imports

Every year, Korea imports about 85% of its total timber supply. In 1978 and 1979, the share of imports reached 91%. (See Table 3.6.) After petroleum, logs were the most important raw materials imported to Korea in the 1960s and 1970s (Korea Foreign Trade Association, 1986 and 1989). Its share in total imports was generally around 10% in that period. When importing wood products, Korea preferred logs to sawn timber or other forms of processed products. Since then, Korea has been either the second or third largest log importer in Asia after Japan and China, depending upon Chinese imports each year.

Korea has traditionally imported from few major sources—for example, hardwood from Indonesia and Malaysia, and softwood from the United States. No diversification of supply source existed until Indonesia banned log exports in 1980. It was only after 1980 that Papua New Guinea and the Solomon Islands, and Chile and New Zealand emerged as new supply sources to Korea for hardwood and softwood logs respectively. In the late 1980s, when Korea and the former USSR were paving the way for formal diplomatic ties, the Russian Far East was added to the new supply sources of softwood.

Generally, hardwood logs took a larger share of total imports in the 1970s. However, from the early 1980s, the hardwood imports have gradually decreased due to the Indonesian log export ban. This has resulted in the decline of the plywood export industry, which was the major user of tropical logs. In 1986 the volume of softwood log imports surpassed that of hardwood logs. In 1991 the share of hardwood logs was 41% of total log imports and the share of softwood was 59%. See Table 3.7.

Table 3.7. Log Imports

	----------Total----------		----------Hardwood----------			----------Softwood----------		
	Quantity	Value	Quantiy	Value	Share*	Quantiy	Value	Share*
Year	(1,000 m^3)	(US$1,000)	(1,000 m^3)	(US$1,000)	(%)	(1,000 m^3)	(US$1,000)	(%)
1970	3,155	125,451	2,852	112,532	90.4	303	12,919	9.6
1971	3,756	160,995	3,296	142,068	87.8	460	18,927	12.3
1972	4,167	131,233	3,834	117,602	92.0	333	13,631	8.0
1973	5,002	283,590	4,411	246,745	88.2	591	36,845	11.8
1974	4,830	312,572	4,042	258,432	83.7	788	54,140	16.3
1975	5,119	269,190	4,661	236,401	91.1	458	32,789	9.0
1976	6,323	415,298	5,450	351,687	86.2	873	63,611	13.8
1977	7,807	524,195	6,584	425,305	84.3	1,223	98,890	15.7
1978	9,427	642,737	6,863	461,438	72.8	2,564	181,299	27.2
1979	9,086	1,008,531	6,670	781,302	73.4	2,416	227,229	26.6
1980	6,141	858,228	4,486	660,613	73.1	1,655	198,215	27.0
1981	5,558	634,635	4,324	495,647	77.8	1,234	138,988	22.2
1982	5,615	607,687	3,998	451,171	71.2	1,617	156,516	28.8
1983	6,524	587,840	4,139	338,552	63.4	2,385	199,288	36.6
1984	5,773	566,625	3,310	351,827	57.3	2,463	214,798	42.7
1985	5,578	479,356	3,228	280,997	57.9	2,350	198,359	42.1
1986	5,772	484,123	3,051	269,106	52.9	2,721	215,017	47.1
1987	6,462	655,454	3,204	363,517	49.6	3,258	291,937	50.2
1988	7,319	900,256	3,502	457,820	47.9	3,817	442,436	52.2
1989	7,787	960,023	3,538	454,791	45.4	4,249	505,232	54.6
1990	8,285	990,474	3,483	418,350	42.0	4,802	572,024	58.0
1991	8,861	1,040,754	3,655	466,496	41.3	5,206	574,258	58.8
1992	8,059	918,516	3,197	423,348	39.7	4,862	495,168	60.3

*Note: Share refers to the share of total quantity.
Source: Forestry Administration (1991 and 1993)

Table 3.8. Hardwood Log Imports by Source

	Total		Indonesia		Malaysia		Philippines		P.N.G.	
Year	Quant.	Value	Quant.	Value	Quant.	Value	Quant.	Value	Quant.	Value
1970	2,852	112,532	477	19,457	1,487	59,923	888	33,152	-	-
1975	4,661	236,401	2,769	142,253	1,628	81,561	264	12,587	-	-
1980	4,486	660,613	1,817	284,462	2,474	351,178	82	11,087	133	13,286
1985	3,228	280,997	12	1,312	2,308	203,988	67	6,622	841	69,076
1990	3,483	418,350	(159)	(14,875)	2,912	361,860	-	-	412	56,490
1991	3,655	466,496	(76)	(7,658)	3,086	409,872	-	5	493	48,961

Note: The figures in () are for the Solomon Islands. Quantity is in 1,000 m^3; Value is in US$1,000
Source: Forestry Administration (1991, and 1992b)

Indonesia was the major hardwood log supply source in the 1970s. However, after its 1980 log export ban, Malaysia became the largest supplier. Its share of hardwood log imports rose from 37% in the 1970s to 73% in the early 1980s. Papua New Guinea provided Korea with the remaining 17% annual average of total hardwood logs in the early 1980s. The Solomon Islands, which became a new source of supply after 1985, presently accounts for about 3% of total hardwood imports. The Philippines was one of the major log suppliers in the 1960s, but it played a minor role in the 1970s because of its own log export ban and resource depletion. Overall, the hardwood supply system in Korea has a fragile structure, with heavy reliance on Malaysia. Indeed, in 1990 and 1991 that country's share reached over 80% of total hardwood log imports. However, a reduction of logging in Sarawak, Malaysia, has been suggested by the International Tropical Timber Organization (ITTO), one of the intergovernmental agencies addressing the issue of tropical deforestation (Linsan gyoosei kenkyukai, 1992). Unless new sources are developed, fewer hardwood logs will be imported to Korea in the future. Table 3.8 shows hardwood log imports from various sources from 1970 to 1991.

The absolute volume of hardwood imports has showed a downturn since 1979. The shortage caused by declining hardwood imports has been gradually made up for with increased softwood imports, which have increased by 17% every year from 1980 to 1991. Table 3.9. shows that the United States has been by far the largest softwood log supplier to Korea, supplying an average of about 70% of all softwood logs imported to Korea for the last twenty years. New Zealand and Chile each account for about 10% each year, and the remaining 10% of total annual softwood log imports are from various other sources, including Russia. However, imports from the United States will drop because of the log export ban from the national forests. On the other hand, the shares of other sources will continue to increase in

Table 3.9. Softwood Log Imports by Source

	Total		USA		New Zealand		Chile		Others*	
Year	Quant.	Value	Quant.	Value	Quant.	Value	Quant.	Value	Quant.	Value
1970	303	12,919	236	9,549	56	2,227	-	-	11	1,143
1975	458	32,789	448	30,624	-	-	-	-	10	2,165
1980	1,655	198,215	1,043	134,085	185	19,556	280	24,583	147	19,991
1985	2,350	198,359	1,494	141,907	99	6,096	514	28,564	241	21,792
1990	4,802	542,606	2,971	416,029	1,290	102,601	289	23,976	252	29,518
1991	5,206	574,258	2,687	366,400	1,786	139,683	425	34,390	308	33,785
1992	4,862	495,168	1,913	267,145	1,792	134,707	754	60,810	403	32,506

Source: Forestry Administration (1991, and 1992b)

Note: Log imports from Russia are not segregated in Korean forestry statistics. Quantity is in 1,000 m^3; Value is in US$1,000.

the future (Forestry Research Institute, 1991). In fact, the share of the other sources than U.S.A. and New Zealand was increased from 13% in 1991 to 24% in 1992 (Table 3.9).

A dramatic change has taken place on the softwood log import structure between 1991 and 1993. The change features an emergence of New Zealand and Chile, what were previously regarded as minor sources, while the major one declines. Log imports from the U.S. have reduced to half between 1991 and 1993 and a further reduction is expected in 1994. On the other hand, the imports from New Zealand doubled and those from Chile tripled during the same period. (See Table 3.10.) These two sources, mainly exporting radiata pine logs from plantation, quickly filled the gaps created by the reduced imports from the U.S.

New Zealand, even surpassing the imports from Malaysia which had been the largest log supplier to Korea for more than a decade, became the largest supplier to Korea of all sources in 1993.[3] More remarkable change during the period was the growth of Russian logs. As a result, the distribution of import shares among the sources greatly leveled off in 1993 and such change is expected to continue in 1994 as estimated in Table 3.10.

Russian logs began to be imported officially to Korea right after the diplomatic ties between the two countries in 1990[4] . Russian log imports have grown dramatically since then. Russian log imports have increased by more than 10 times since 1991. Although Russian

[3] *Korea Economic Daily,* 15 February 1994.

[4] A small amount of Russian logs had been sporadically imported through Japanese trading companies since the early 1980s.

Table 3.10. Softwood Log Imports to Korea (1,000 cubic meters).

Year	USA		New Zealand		Chile		Russia		Total	
1991	3,137	(68)	1,133	(25)	261	(6)	62	(1)	4,598	(100)
1992	2,273	(45)	1,792	(36)	754	(15)	193	(4)	5,012	(100)
1993	1,501	(29)	2,147	(42)	902	(18)	572	(11)	5,122	(100)
1994	1,300	(22)	2,300	(39)	1,500	(25)	800	(14)	5,900	(100)

Note: The figures in bracket are shares
Source: Tak(1994)

logs still have the smallest share among the major softwood log sources, they are expected to gain a sizable 13% share in 1994. The changes over the years clearly indicate a trend of importing more softwood than hardwood as well as a shift of import sources from traditional sources to newer and less known sources.

3.4. Use of Forest Products

Wood use in Korea is broadly grouped in four categories, namely, mine-props, pulpwood, plywood, and others, the share of which in total wood use between 1968 to 1980 averaged 7.8%, 5.1%, 40.4.% and 46.7% respectively. as in Table 3.11. The trend in wood use, however, shows a somewhat different picture. Fewer and fewer logs have been used for mine-props during the past twenty years. The share of pulpwood has stabilized at about 5% over the period. Plywood production was the dominant use of logs up until 1980, over 50% of logs were used for this before 1980. However, plywood's share has shrunk to 20% since then. The share of other wood uses grew from 27% in 1970 to 69% in 1990. "Other" here represents mainly sawnwood, furniture and musical instrument production. This illustrates the fact that the forest industry has become more highly structured than it was 20 years ago.

Table 3.11. Trend of Wood Use (%)

Year	Mine-prop	Pulpwood	Plywood	Others	Total
1970	11.3	5.2	56.8	26.9	100
1975	8.4	2.9	49.9	38.8	100
1980	6.7	7.1	43.4	43.1	100
1985	9.8	8.0	30.1	52.1	100
1990	5.4	5.1	20.0	69.4	100

Source: Forestry Administration (1991)

Table 3.12. Share of Log Uses by Various Sources (%)

Origin of Logs	Building Interior	Temporary Construction	Packag-ing	Furniture	Pallet	Shipbuilding & Container	Other	Total
Korea	17.2	44.7	16.7	3.4	4.3	0.3	13.4	100
U.S.A.	23.9	55.2	8.6	5.6	1.5	-	5.2	100
Chile	27.4	63.6	6.0	1.1	1.7	0.1	0.1	100
N.Z.*	27.5	66.3	0.6	3.1	-	-	2.5	100
Russia	40.0	50.0	-	5.0	-	-	5.0	100
S.E.A.*	49.5	16.9	3.5	21.6	2.5	0.9	5.1	100
Total	29.1	48.2	7.5	7.4	2.1	0.4	5.3	100

* N.Z.: New Zealand, S.E.A.: Southeast Asia
Source: Forestry Research Institute (1993b)

Since 100% of mine-props have been supplied domestically, as has most pulpwood, virtually all imported logs have been used for plywood and other products including sawnwood, which now account for most of the forest products produced in Korea. Indeed, imported logs have played a key role in the development and structuring of the forest products industry in Korea.

Table 3.12 shows how imported logs are distributed in terms of final uses. As in the table, each origin shows different significance in certain final products. Building interior and temporary construction are two main uses in most of origins. Besides these two main uses, large percentages of domestic logs and Southeast Asian logs are being used for packaging and furniture respectively. Russian logs, relatively new to Korean market, have fewer uses than the others. However, Russian logs have been increasingly gaining their acceptance in Korean markets after their uses were experimented over years now.

A large part of the demand for wood is derived from housing construction. The number of housing starts has been a significant indicator of wood consumption in Korea (as in North America), although Korea uses significantly less wood for its housing construction than North America and Japan do.

Over 95% of all Korean residential units are in concrete high-rise apartment building complexes. Only a handful of vacation homes are of wood-frame construction. Wood is also used as a disposable material in making concrete forms and other temporary items on the construction site. This is why Korea has a relatively small amount of wood consumption in relation to its world's highest rate of housing starts per capita. Table 3.13 shows that housing starts numbered 750,378 units in 1990 and 613,083 units in 1991. With 42.8 million and 43.3 million people in Korea in 1990 and 1991, the rates per 100,000 people are 1,757 and 1,416

Table 3.13. Rates of Housing Starts in Korea and Other Countries

Country		1989	1990	1991	1992
	Population (000 persons)	42,474	42,869	43,327	43,717
Korea	Housing Starts (000 units)	462	750	613	N.A.
	Units/100,000 persons	1,087	1,757	1,416	N.A.
	Population (000 persons)	123,200	123,610	124,040	124,450
Japan	Housing Starts (000 units)	1,662	1,707	1,370	1,403
	Population (000 persons)	26,369	26,610	27,297	27,409
Canada	Housing Starts (000 units)	215	182	156	158
	Units/100,000	814	683	572	578
	Population (000 persons)	247,342	249,900	252,671	255,462
U.S.A.	Housing Starts (000 units)	1,376	1,193	1,014	1,200

Source: Compiled from Korea Statistical Association (1992), Economic Planning Board (1988), National Board of Statistics and Economic Planning Board (1990), Japan Statistics Bureau(1993),StatisticsCanada (1993), and US Dept. of Commerce (1993)

respectively. These figures are much higher than 477 and 401 in the United States, 683 and 572 in Canada and 1,381 and 1,105 in Japan in the same years.
However, since wood is also used for wooden furniture, cabinets, doors and windows, fixtures, paneling and interior decoration, there is still a strong demand for wood in Korea, despite the relatively low use of wood in housing construction itself.

Traditionally, Koreans have had a strong desire to own their own houses, for several reasons. Culturally, having one's own house suggests success in one's life. The house is used as a means of investment for financial security. Therefore, a house has been one of the most important things to own for the average Korean. However, a concentration of population and skyrocketing land prices have created a severe shortage of housing, especially in the big cities. In response, the government has conducted a massive housing construction program since the mid-1970s.

Indeed, the new government is planning to build 2.9 million new residential units in the next five years. The main part of the plan is to build five new cities on the outskirts of Seoul with approximately 340,000 units. This means there will be 550,00 - 600,000 new housing units every year for the next five years, and wood demand in Korea is thus expected to grow continuously.

Table 3.14. Shares in Total Exports

Year	Total Exports (A)	Exports of Forest Prod. (B)	Share (C=B/A)	Export of Plywood (D)	Share (D/A)	Share (D/B)
	--------(US$ million)---------		(%)	(US$ million)	(%)	(%)
1965	175	21	12.0	19	10.9	90.5
1970	835	110	13.2	102	12.2	92.7
1975	5,081	294	5.8	229	4.5	77.9
1980	17,505	629	3.6	352	3.6	56.0
1985	30,283	264	1.7	40	0.87	15.2
1990	65,016	610	1.8	38	0.05	6.22

Source: Forestry Administration (1992b)

3.5. Structural Changes in the Forest Products Industry

With an 85% reliance on imports, the forest products industry in Korea has experienced many structural changes arising from the situations in log-supplying countries. Rapid growth of the domestic economy has also contributed to such changes. This section briefly discusses the development of the industry and its structural changes over the last 25 years.

It is not an exaggeration to say that the forest products industry was led by plywood manufacturing beginning in the mid 1960s. Plywood manufacturing was one of the strategic industries for earning foreign currency. In addition, it was a well chosen labour-intensive industry in a country, which had inexpensive labour at the time. The share of plywood exports in total exports of the country was over 10% between 1964 and 1972, and plywood was the country's largest export earner from 1968 to 1970.

Table 3.14 illustrates that the importance of the industry has gone through a dramatic change since the log export ban was imposed by Indonesia in 1980. In particular, the share of plywood in total exports has sharply dropped from 11% in 1965 to less than 4% in 1980 and less than 1% in 1990. The share of plywood in total exports of forest products has also plunged from as high as 91% in 1965 and 56% in 1980 to 6% in 1990. This shows the dramatic shrinkage of the importance of plywood as an export item.

Likewise, the share of forest products in total exports fell during the same period, from 12.0% in 1965 to 1.8% in 1990. Korean forestry statistics include totals for such non-wood products as nuts, mushrooms and even stone products. The share of these forest by-products

surpassed that of wood-products since 1984. If they are excluded, the share of forest products in total exports become even smaller than in Table 3.14.

The forest products industry experienced a structural change in the 1980s because of a shortage of logs, increased labour costs, and the growth of the domestic economy. This caused the industry to change from being an export-oriented, labour-intensive, low-value-high-volume-producer to being a domestic market-oriented, capital-intensive, high-value-added producer.

As a result, plywood manufacturing no longer takes a leading role in the forest products industry, nor in exports. After the Indonesian log export ban, the shortage of logs became an acute problem for the industry. In attempting to build its own industry, Indonesia used a ban on the export of unprocessed wood as a tool to secure a greater share of plywood manufacturing from countries like Korea, Japan, and Taiwan. The resulting scarcity of hardwood logs made the Korean plywood industry not only stop exporting its products but also deliver an inadequate supply to the domestic market. Increased labour costs made it unable to stay in operation domestically and to remain competitive internationally.

With the help of the rapidly growing home economy, the domestic market grew large enough to divert the attention of the forest industry into domestic markets, which previously had attracted little attention from the industry. The ensuing housing construction boom and heightened living standard contributed to an increase in domestic consumption of wood products. As well, the industry shifted towards the production of more value-added products such as furniture and musical instruments.

3.6. Pulp and Paper Industry

The pulp and paper industry has shown a rapid growth over last 3 decades. The paper demand in 1992 was 7.6 million metric tons, which is as high as 61 times the demand in 1965. The average annual growth rate of paper production between 1970 and 1990 was 14%, which is much higher than average annual GNP growth, 9%, during the same period. Paper demand has shown a remarkable growth since 1988 due to the dramatic increase in publishing materials with the rapid advance of democratization in the country. The paper demand of 1985 doubled in 1990 and tripled within a year in 1991. Compared to the previous year, paper demand showed 60% increase in 1991 and 11% in 1992. The paper industry is quite self-sufficient industry. Although the industry showed increased imports in recent years and put it into timber deficit situation, the self-sufficiency will be recovered by the expansion of production capacity over next years.

Table 3.15. Demand and Supply of Paper Products

Year	Demand	Domestic Production	Imports	Exports	Rate of Self-supply
	(1,000 metric tons)				(%)
1965	124.9	120.4	4.9	0.4	96.4
1970	357.8	329.5	28.3	0.05	92.0
1975	643.5	661.7	18.0	36.2	102.8
1980	1,557.3	1,680.0	31.5	154.2	107.9
1985	2,293.8	2,312.1	91.2	109.5	100.8
1990	4,309.8	4,524.4	301.5	516.1	105.0
1991	6,043.0	4,922.0	1,550.0	429.0	81.5
1992	6,586.0	5,504.0	1,627.0	545.0	83.6

Source: Forestry Research Institute (1991, 1993b)

The demand for pulp was 1.7 million metric tons in 1992. The demand was nearly 20 times larger than that of 1965. Majority of pulp demand in Korea is filled by imports. The self-sufficient rate has kept falling for last 3 decades as the domestic supply has not grown as fast as demand has. Mechanical pulp took up a major part of pulp production in Korea before the first chemical pulp mill was built in 1981. Since then both mechanical and chemical pulps have maintained a similar level of production (See Table 3.16). As the production increases, more pulp has come from foreign sources rather than domestic ones, the supply from which has been increasingly expensive over years. Domestic pulp accounts for only 18% in 1992 and the past trend clearly indicates an increased rate of imported pulp.

Table 3.16. Pulp Demand and Supply

Year	Demand	Imports	Domestic Production			Rate of Self-sufficiency
			Total	Pulp Type: Chemical	Pulp Type: Mechanical	
	(1,000 metric tons)					(%)
1965	92.2	59.1	33.1	1.4	31.7	35.9
1970	239.7	159.5	80.2	4.8	75.4	33.5
1975	325.2	231.4	93.8	6.7	87.1	28.8
1980	620.3	453.2	167.1	29.7	137.4	26.9
1985	834.5	567.0	267.5	129.0	138.4	32.1
1990	1,468.5	1,150.1	318.4	159.0	159.4	21.7
1991	1,543.5	1,216.0	327.5	160.1	157.4	21.2
1992	1,778.4	1,456.0	322.4	161.7	160.7	18.1

Source: Forestry Administration (1993)

Table 3.17. Raw Material Supply for Paper Production

Year	Total	Prod.	Import	Total	Prod.	Import	Total	Prod.	Import	Share of Total RM Supply Recycled	Self-suffi-ciency Rate
	----------Total----------			----------Pulp----------			-------Recycled Paper------				
	----------(1,000 metric tons)----------									----------(%)---------	
1988	3,886	1,728	2,158	1,169	307	862	2,717	1,421	1,296	69.9	44.5
1989	4,195	1,920	2,275	1,251	301	951	2,943	1,619	1,324	70.2	45.8
1990	4,799	2,176	2,623	1,457	301	1,156	3,342	1,875	1,467	69.6	45.3
1991	5,184	2,418	2,766	1,540	324	1,216	3,544	2,094	1,550	70.3	46.6
1992	5,719	2,636	3,064	1,767	311	1,456	3,952	2,325	1,627	69.1	46.1

Source: Forest Research Institute (1993b)

Recycled paper plays an important role in paper industry in Korea, since it accounts for about 70% of annual paper production. Taking recycled paper into account, the self-sufficiency rate rises to about 45% in paper making in Korea. Nevertheless, imports of both pulp and recycled paper have shown an increase over recent years (Table 3.17).

In summary Korean economy, although its growth has slowed down in recent years, will continue to grow at average annual growth rate of 7% for the next 5 years as forecasted by Economic Planning Board (1993). However, one of the conditions to achieve it is the security of raw material supply including logs. Since the domestic resource base can supply only a small fraction of total demand, Korean economy will continue to rely heavily on foreign supply sources. The situation in traditional log supply sources, however, has been changing in favor of not increasing their production and exports mainly due to environmental problems and protection of their own industries. Korea will face difficulties to secure raw materials from traditional supply sources and increasing volume of logs will be imported from newer and lesser known sources such as the Russian Far East. In the following chapter, market potential of Russian logs is discussed.

4. MARKET POTENTIAL OF RUSSIAN LOGS IN KOREA

This chapter examines the potential increase of Russian log import to Korea. First this chapter will discuss the areas where such potential exists. Second, it will also discuss the limiting factors which prevent such potentials from being realized.

4.1. Potentials

Russian log potential in Korean market can be discussed from three perspectives: overall demand outlook for wood in Korea, Russian logs penetration into the market where competitor species are being used, and overseas investment.

4.1.1. Outlook of General Timber Demand

First, Korea's wood consumption has increased at average 7% a year from 1970 to 1991 and recorded nearly 15 million m^3 in 1992. This rate of growth is expected to continue for the time being. In a country like Korea where the reliance on imported logs is very high, substituted materials are always encouraged. Consequently, wood consumption per capita has almost stagnated for last 20 years. Despite the low rate of the consumption per capita, however, the growth of population and industrial activities will make the total wood consumption keep growing for the next few decades.

Judging from the fact that over 85% of the consumption has been supplied by imports and the increase of domestic supply up to 50% is expected to be realized only after 2030 (Forestry Research Institute, 1991), the heavy reliance on imports will continue for the time being.

One factor that might be necessary to add to this outlook at this point of time is the reunification of South and North Korea. Some political analysts predict a unification by year 2000. They use a number of different scenarios predicting how and when the unification would occur. However should unification be achieved, South Korea may bear the burden of integrating the underdeveloped North Korean economy to the level of the South within a short period of time, as seen in Germany. This suggests a massive increase of wood consumption by the unified Korea.

Unification of Korea has a particular implications for Russian logs, which has been imported to North Korea through long term logging joint ventures between the two countries since the late 1960s. The existing Russian-North Korean joint venture which is estimated to produce 3 million m^3 annually before the output is divided by agreed ratio. Unified Korea would take advantage of the joint venture experience by North Korea and continue or expand the production. In that case, unified Korea would direct its investments towards improving the productivity of the joint ventures.

Another factor can be added to the discussion is potential growth of number of wooden house. Currently only less than 5% of the houses being built in a year are single family

homes. The rest is mainly high rise apartments which are built with concrete and bricks. Since even the majority of single family homes is built by same non-wood materials, wooden house can be found only in a small number of secondary homes for vacation purposes. Although high rise apartment building has been characterized as a main type of housing in Korea, Korea traditionally had built homes with wood as well. Advantages of wooden frame house are becoming increasingly recognized especially among the wealthy class people who can afford building their own single family homes or secondary vacation homes. In the unified Korea where more space will be available for housing, more people may go back to traditional way of building homes, thus increasing the demand for wood.

4.1.2. Potential Market Penetration by Russian Logs

While overall growth of wood demand in Korea will provide an opportunity for increasing Russian log imports to Korea, based on an expanding market for imported logs regardless of origin. Russian logs can also potentially increase their market share. First of all, the Russian Far East, from which almost all Russian logs are imported to Korea, is closely located to Korea. It takes only a few days to ship them to Korea from the Russian Far East whereas it takes 20 days from the U.S., 18 days from New Zealand and 50 days from Chile. The short distance provides potential saving of shipping cost and time (Forestry Research Institute, 1993a).

In addition to the geographic proximity, Russian logs have superior wood property to comparable logs from other sources. Another advantage of Russian logs is relatively newness to Korean market and their potential uses have not yet been fully explored. Further discussion in greater detail is as follows:

4.1.2.1. Substitutability

The competitors of Russian logs are from three sources, U.S., New Zealand, and Chile. U.S. logs are mainly hemlock and small proportion of Douglas-fir. Both Chile and New Zealand export radiata pine to Korea. From Russia spruce, fir and larch are imported. As presented in Table 3.12, most of the softwood logs imported to Korea find their uses in low value applicattions such as temporary uses at construction works and building interior.

Table 4.1 shows that the share of each species in the 5 most common uses. It shows a distribution proportional to its share in softwood log imports except furniture and flooring in which Russian logs have higher share than their import shares.

Table 4.1. The Share of Softwood Species in Most Popular Uses in 1992 (%)

	Share of	----------Low Value Uses----------			-----High Value Uses-----	
	Softwood	Temporary	Building			
Log Sources	Log Imports	Construction	Interior	Packaging	Furniture	Flooring
(N. America)	45.1					
Hemlock/D.F		42.5	44.4	42.0	56.6	17.7
Spruce/Fir		1.3	-	-	-	-
Red Cedar		1.8	4.3	-	-	17.7
(N.Z./Chile)	51.0					
Radiata Pine		51.5	42.0	53.2	13.2	-
(Russia)	3.9					
Spruce/Fir*		3.0	9.2	4.8	30.3	17.7
Larch		-	-	-	-	47.1
Total	100	100	100	100	100	100
Share in Total Wood Consumption		43.5	23.5	16.2	8.8	1.9

Source: Forestry Research Institute (1993b)

*Note: The figures in this line are estimation because these two Russian log species are not segregated from the logs of other sources than the U.S., New Zealand and Chile in Korean statistics.

These five uses account for 94% of total softwood log consumption in Korea. Compared to its short history in Korean market, Russian logs share surpassed radiata pine in high value uses such furniture and flooring.

Although it may be hasty to make a conclusion without more detailed information on specific uses especially in the first two broad categories of low value uses, it can be judged from the above table that logs from the three sources can compete in the first three use categories where logs are used for low value purposes. Within these low value use categories where preference of specific species is a less decisive factor, substitution of one species for another can easily take place. In the last two categories of more value-added uses, Russian logs show higher share than radiata pine logs despite the log's smallest share of imports. All these suggest that Russian logs can compete with all other softwood logs in major uses in Korea.

Table 4.2. Area of Competition and Relative Market Share Index of Russian Logs

	Hemlock/Douglas-fir (U.S.A.)	Red Cedar (U.S.A.)	Radiata Pine (New Zealand)
Spruce (Russia)	1. FL (1) 2. FU (0.54) 3. B.I. (0.21) 4. PK (0.11) 5. T.C. (0.07)	1. B. I. (2.1) 2. T. C. (1.7) 3. FL (1)	1. FU (2.3) 2. B.I. (0.22) 3. PK (0.09) 4. T.C. (0.08)
Larch (Russia)	1. FL (2.7)	1. FL (2.7)	

Notes: 1. Area of competition:
FL: Flooring, FU: Furniture, B.I.: Building Interior, PK: Packaging,T.C.: Temporary Construction
2. The number inside of brackets represents market share in one uses relative to Russian logs (Relative Market Share Index:RMSI).
RMSI = 1: Russian logs have same market share
RMSI > 1: Russian logs have larger market share
RMSI < 1: Russian logs have smaller market share
The competing uses are ordered by RMSI. Higher RMSI gets higher order.

Since market share generally reflects one product's competitive power, the relative market share index represents the degree of competitiveness of Russian logs with other competitor logs at a certain point of time. A table can be constructed on the potential competition with other logs. Table 4.2. shows that Russian logs compete with other logs in most of major uses, but generally are less competitive than others in those uses.

For example, in the competition with hemlock and Douglas-fir, Russian spruce is equally competitive only in flooring and less competitive in all the rest uses. Russian spruce showed its superiority over American red cedar in building interior and temporary construction areas. With radiata pine, Russian spruce competes in 4 major uses but is advantageous only in furniture manufacturing. However, the survey of 6 major Korean companies using Russian logs responded that Russian logs after sawn are superior to radiata pine in strength, wood color and texture, and workability in terms of the strength holding nails. Russian larch competes with all American logs only in flooring market and shows more competitiveness over all of them.

In short, the above table demonstrates that Russian logs can compete with all other major competitor logs. In addition, Russian logs have also demonstrated that they can capture a large part of Korean market in certain uses despite the short period of its introduction to the market. The current low market share does not necessary suggest the same rate of share in

the future. It rather implies a large potential increase in the share. Since Russian logs have the lowest market share now, it can be said that it has the largest room to grow in Korean market. All these contribute to the positive aspects of Russian logs in Korea.

4.1.2.2. Pattern of Major Log Suppliers

Looking back last two decades, a pattern is observed from the changes in major log suppliers to Korea. Since Korea is relatively small market, one major supplier usually has dominated either hardwood or softwood log supplies. Indonesia was the major hardwood log supplier until the country banned log export in 1980. Indonesia was succeeded by Malaysia after 1980 to become the largest supplier to Korea. Among the softwood log suppliers, the U.S. had been the dominant softwood log supplier until it was replaced by New Zealand in 1993. Whenever these shifts took place, the main force behind was price increase. The price increase was driven mainly by short supply, which stems from either environmental concerns or protection of their own industries in supplying countries.

Price is such a powerful driving force that the shift of supplier is not only taking place among the suppliers of one kind of comparable species logs but even with different species. For example, hardwood logs have been gradually replaced by softwood logs since the former became more expensive than the latter in 1980.

The growth of radiata pine in Korean market could be a good example to illustrate how new species logs can take a significant share of Korean market in a short period of time. The imports of radiata pine from New Zealand goes back to as early as 1965. Though it was the second largest softwood log source after U.S., the amount of imports was less than 10% of U.S. until the late 1980s. It was only as late as 1978 when the same radiata pine from Chile began to be imported. Because of the dark color and softness of the species, its use was only found in limited areas such as packaging and temporary uses in construction works. Its main uses have not been diversified yet, but it has been replacing a large part of the uses previously taken over by the logs from U.S. Now radiata pine is the most popular logs of all species imported to Korea. Soaring price as well as reduced production of logs in the U.S. and increased wood demand by domestic construction boom in the early 1990s further fueled such shift of log supplier.

Imports of radiata pine also shows a good example of how Korean market is different from Japanese market, which takes quality of wood more seriously than Korea. Korea imported about same amount of radiata pine from New Zealand in 1992 and more than Japan in 1993. While logs from U.S. still make up the major part of softwood log imports to Japan despite its

soaring price, Korean market which couldn't stand with the increase, quickly shifted its major source of wood to radiata pine.

Appearing to have intrinsic characteristics superior to these if radiata pine, Russian logs may be able to occupy the role played by New Zealand/Chile as suppliers of wood raw material to the Korean market. Pricing strategy seems to be one factor which can influence the outcome in favor of Russia.

Overall pattern observed for the last two decades was that whenever a dominant supplier's capacity declines for the reasons explained above, previously a minor supplier succeeded the major supplier's position. In that terms, Russian logs with the smallest share now has the largest potential growth in Korean market than any other sources.

4.1.3. Overseas Investment in Forestry

Another factor that can be added to the analysis of potential increase of foreign logs is foreign investment in forestry. Korean forest industry has searched for alternative sources of raw material ahead of other industries. It is not a coincidence that a logging venture in Indonesia in 1968 was the first Korean foreign investment of all industry. Since its first forest development joint venture in 1968, eleven Korean companies have invested over U$100 million in 7 countries for logging projects, and U$85.7 million in 46 projects for forest products manufacturing projects (Forestry Research Institute, 1993a). As the log exporting conditions become tougher due to environmental concerns and the desire on the part of hitherto log exporting regions to secure additional value adding manufacturing at home, foreign investment has been increasingly recognized as an alternative means to get access to raw materials necessary for forest industries in Korea. The foreign investment is also being diversified in its activities from formerly logging and low level of processing to high value added manufacturing such as furniture manufacturing, or reforestation project for long term security of supply. Korea's largest newsprint company invested recently in a reforestation project in western Australia and more investments are planned for same projects in Vietnam, New Zealand and Indonesia.[5]

Not surprisingly, Korea wasted no time to form a forestry joint venture in the Russian Far East as soon as it formed the new diplomatic tie with the former Soviet Union in 1990. The Korean-Russian joint venture located in Svetlaya, contrary to the expectation and enthusiasm at the outset, had difficult times mainly due to environmental problems and the joint venture

[5] Seoul Economic Daily, 17 July 1993.

came under threat to closure after a few years of operation. The joint venture seems to have survived the threat and stays on operation with an annual production reduced to one quarter of original plan. The joint venture demonstrates how to get access to Russian logs. The fact that it is still operating despite many problems also reflects Korea's long term interests in the region rather than short term financial gains. If the investment climate would improve in Russia, it is expected that more investments could be undertaken. In that case, perhaps investment in the environmentally sensitive projects like logging would be avoided and more processing oriented projects would be favored.

Reunification will be another positive factor for Korea to import logs from the Russian Far East with a unified Korea interested in keeping the former Russian-North Korean logging joint ventures operating. Investment could be directed to increase the productivity of these former joint ventures.

4.2. Limiting Factors

Despite the potentials described above, Russian logs do have factors limiting their potential. Among a number of limiting factors, this section focuses on the most restraining factors to increase Russian log imports by Korea: log price and grading system. Also discussed here is how to overcome or improve these limiting factors.

4.2.1. Log Price

Price is a major factor affecting the volume of log imports in Korea. This price sensitivity is one of the characteristics of Korean market, where the majority of logs are used for low value purposes. The share of raw material cost is usually higher in these low value uses than in high value uses. In other words, the impact of price increase is more serious in low value uses than in the high value uses. Different from Japanese market which has long developed its own uses for specific log species (for example, for structural components for housing), the Korean market is not as traditionally bound to use only certain species for certain uses. Accordingly, the Korean market, where logs are used for more low value ends, and for which the cost of wood raw material accounts for a significant share of the overall cost of production, is less resistant to price change than higher value end market like Japan.

Table 4.3. shows that saw log grade from Russia is not competitive at all in terms of price and quality and is not imported to Korea now. Instead, pulp log grade is imported and used for producing lumber in Korean saw mills. Pulp log grade has price competitiveness and high demand in Korea, but supply does not meet the increasing demand. The export tax based

Table 4.3. Price of logs from different sources (May 1994)

Sources		Grade Length (m)	Diameter (cm)	Price $/m^3$ CNF Inchon
North America	K sort	7.3, 11	30	130
New Zealand	K sort	7.3, 11	26	100
Russia	Saw Log	3.8, 4	22	120
	Pulp Log	3.8, 4	16	64

Source: Tak (1994)

upon log volume regardless of grade discourages Russian supplier to increase the exports of low grade logs Korea need. The export tax has also increased the price of logs.

Table 4.4. shows relative price and market share between the logs from U.S. and New Zealand. Relative price represents the proportion of New Zealand log price in the U.S. log price. The smaller this figure is, the larger the difference between the prices of the logs from the two sources. Relative market shares over years portrays New Zealand logs' progressive substitution for U.S. logs. In the last five years there was a noticeable increase in this figure. During this period the relative price was kept under 0.61. In other words, as long as the

Table 4.4. Relationship between U.S.A. and New Zealand Logs

Year	Relative Price (NZ/USA)	Relative Market Share (NZ/USA)
1978	0.64	0.075
1979	0.67	0.179
1980	0.82	0.177
1981	1.12	0
1982	0.67	0
1983	0.70	0.055
1984	0.63	0.091
1984	0.65	0.066
1986	0.66	0.057
1987	0.58	0.048
1988	0.61	0.147
1989	0.55	0.236
1990	0.57	0.434
1991	0.57	0.619

price difference between the two logs is less than 40% of the U.S. logs', U.S. logs can maintain its competitiveness in price. Conversely, once the U.S. log price rise and the gap with less expensive one becomes more than 40% of its own price, an active substitution takes place with less expensive logs.

Inflexibility of log price is another limiting factor to increase imports from Russia. Log price is posted by major exporting arms like Dal'les periodically. The price is fixed within the period and is generally not reflecting international market price, which changes all the time depending on demand and supply situation in the world market. This makes Russian log imports more unattractive. In order to increase imports of Russian logs by Korea, Russia should make log price more negotiable and realistic to world market price.

4.2.2. Log Grading System

Another limiting factor closely related to price is Russian log grading system. Russian logs are measured and graded by Russian national standard (GOST: *Gosudapstvennyy Standart*), which produces smaller volume than measured by Korean Standard. The volume loss caused by the differences between GOST and the Korean Standard ranges from 8% in saw logs to 12% in pulp logs. In addition to volume, there is additional loss caused by the difference of cut length. Korean sawmills cut logs to 3.6 meters while Russian logs are cut 3.8 meters. This creates 20 centimeter loss lengthwise from each piece of log. This loss can be converted to extra 5 % volume loss. If all the losses caused by different grading system are taken into consideration, Russian logs become even more expensive than quoted in Table 4.3.

This is the problem which should be fixed as early as possible for both importer's and exporter's benefit in the long run. Japan is well ahead of improving this problem and has successfully reduced the volume loss to less than 5% (Shiba, 1992). It is necessary to create a volume conversion table agreed to by both countries and applicable for export grading. It would reduce the loss caused by using different grading systems. Korea may also need to form an organization representing Russian log user's interests to improve the situation. Investment in saw milling in Russia targeting Korean market can be a way to reduce this problem. At the same time, Russia can develop a new log grading system suitable for Korean market.

4.2.3. Other Limiting Factors

In 1991, Forestry Research Institute (1991) surveyed Korean log importers for their preference of log supply sources including hardwood log sources in Southeast Asia. Log

Table 4.5. Logs Importing Conditions by Sources (%)

Factors Affecting Log	Log Supply Sources					
Importing Conditions	U.S.A.	Chile	N.Zealand	Russia	S.E.A.	Total
Price Instability	21(3)	12(1)	15(2)	23(4)	29(5)	100
Deformation and Degradation of Log Quality	13(1)	24(4)	20(3)	19(2)	24(4)	100
Quality of Service	12(1)	19(2)	20(3)	29(5)	20(3)	100
Security of Supply	16(1)	16(1)	16(1)	23(4)	29(5)	100
Grading System	12(1)	13(2)	20(3)	31(5)	24(4)	100
Log Export Policy	15(2)	16(2)	12(1)	29(5)	28(4)	100
Investment in Resource Development Projects	11(1)	17(2)	17(2)	30(5)	25(4)	100
Average	14(1)	19(3)	17(2)	26(5)	25(4)	100

Source: Forestry Research Institute (1991)

Note: 1. S.E.A: Southeast Asia

2. Except the first two, each category gets higher score when its condition is poor.

importers were asked of seven categories of log importing conditions. Table 4.5. shows the survey result.

Overall ranking of importing conditions of softwood log sources shows a strong correlation with the import volume of each log source at the time of the survey.[6] The higher one source was ranked, the more volume of logs was imported. In other words, more logs are imported from a source when the importing conditions of the source are favored by Korean importers. Russia was ranked at the lowest. Since it was surveyed in 1991, the importing conditions in some countries have changed. For example, New Zealand has changed its own grading system and its relative price condition has been improved by the price hike of the U.S. logs. By the help of such improvements, New Zealand became the largest log exporter to Korea. This suggests that log imports from one source can be increased by improving these importing conditions.

To improve the overall conditions, more things seem to be done in Russia rather than in Korea. A number of conditions require changes at a governmental level, namely, price instability, log export policy, security of supply and investment in resource development project. Changes in these areas can be expected only in the longer term. The area in which the two countries can improve conditions promoting exports from Russia in the shorter term are quality of service and grading system.

5. OUTLOOK OF RUSSIAN LOGS IN KOREAN MARKET

The purpose of this chapter is to project the volume increase of Russian logs in Korean market by year 2000 based upon the above discussion. Three scenarios, pessimistic, expected and optimistic, based largely on subjective factors, are used for the projection.

Now Korea imports about 5 million cubic meters of softwood logs. If the softwood log demand would rise as same rate as total wood demand increase, 7% a year, the softwood demand will reach 8 million cubic meters by year 2000. This level of increase will be supported by increased population, increased per capita income, continued construction boom in Korea despite ever increasing substitution for non-wood materials. The imports of Russian logs will largely depend on the price of Russian logs themselves and their competitor's price, mainly logs from U.S. and New Zealand. Since price is the most crucial factor to determine the level of import volume, the projection here is mainly based on the price changes.

Pessimistic scenario is the case when Russian logs become more expensive than the current level and become as expensive as U.S. logs. It that happens, Russian log imports will remain less than 10% of total softwood log imports, or less than 800,000 cubic meters a year by year 2000. Mainly low grade pulp logs will be imported.

Expected scenario is that Russian log prices maintain their current levels, that is, more expensive than the New Zealand log but less expensive than the U.S. log. In this case, Russian saw logs are still not competitive to both the U.S. and New Zealand logs. Under this scenario, Russian log imports will largely rely on low grade pulpwood, whose supply will be constrained by Russian export tax. Under this scenario, Russian logs will make up between 15% and 20% of total annual softwood log imports, or between 1.2 million and 1.6 million cubic meters.

Optimistic scenario is that Russian log price maintain its competitiveness with both U.S. logs and New Zealand's. There is not enough historical data accumulated for Russian log imports to Korea for this projection. According to the market share in Korea and the survey of 6 Korean firms, Russian logs are competitive to New Zealand logs but less competitive to U.S. logs. But the estimated competitive edge Russian logs have against New Zealand logs is not large. Only 10% of price gap would make Russian logs stay competitive. With U.S. logs, Russian logs would be competitive only by having over 30% price difference. If Russian log price is competitive against both competitor logs, Russian logs share will increase up to

between 30% and 50% of total softwood log imports by year 2000. In terms of volume, it will be between 2.4 million and 4 million cubic meters.

The above projection have not considered the potential improvement of grading system, which would make Russian logs competitive by more than 10% in terms of price, if that happened. General wood demand conditions are positive in Korea and so are the market conditions for Russian logs. Russian logs demand in unified Korea will easily add at least 1 million cubic meter a year to the above outlook. As mentioned earlier, more limiting factors reside in Russia than in Korea. Once the instability currently prevailing in Russia is removed, Russian logs will be able to expand the share in Korean market and as seen in the New Zealand case, Russia could even be the largest exporter to Korea.

6. SUGGESTIONS FOR FURTHER STUDIES

A statistical analysis would enhance the validity of the arguments and outlook projections made in this study. Especially price sensitivity of Korean market and its comparison with Japanese market would greatly improve the understanding of the characteristics of both markets as well as the predictions for Russian log imports to these markets. A statistical analysis on the competition among the competitor logs in response to price changes will also help the accuracy of predicting Russian logs market potential in Korea. Further research on Russian log imports to North Korea and to unified Korea through foreign direct investments will improve the integrity of market study of Russian logs potential in the Northeast Asia.

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Appendix I

Korean Firms Surveyed

To protect the firms and people responded to this survey, their names are not used but coded by alphabets as in the followings:

Firms	Type of Business	Imports in 1993 (m^3)	Products
A	Imports/Manufacture	278,000	Furniture
B	Imports	24,000	
C	Imports/Manufacture	40,000	News Print
D	Imports/Manufacture	30,000	Flooring
E	Manufacture	18,000*	Sanitary Items*
F	Imports/Manufacture	72,000	Building Interior

Note: * 18,000 is 4 year average. Sanitary items include chopsticks, ice cream bar stick, etc.

Survey Questions

1. Volume, grade, species imported in recent years
2. Endusers in Korea
3. Specific uses of Russian logs in Korea
4. Import price
5. Comparative advantage of using Russian logs
6. Competition with other logs
7. Substitutability
8. Potential increase of imports and problems
9. Grading Systems
10. Quality of logs
11. Importing conditions (Services)