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Trends of House Construction and Wood Industries after the Asian Economic Crisis in Korea

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The economic crisis of Korea occurred from the second half of 1997 had direct and serious influence all over the domestic economy. This study considered what influence change of the housing construction that determines wood demand, and the exchange rate that are the main causes of an economic crisis had on timber supply and demand structure or wood industrial structure. In results, rapid dullness of the housing construction activity under an economic crisis brought about the big reduction of wooden product demand including the plywood. In addition, although the sudden drop of an exchange rate raised the imported wood price and brought about reduction of the imported timber volume in 1998, it raised the domestic price of wooden products to 30% or more with the rise of a production cost to wood industries, such as plywood which depends for a great portion of product production raw material on imported timber, and brought about retreat of wood industry. However, in contrast with dullness of such wood industry, in order that flooring industry might sell the apartment by the housing construction company amid economic depression, the demand in the form which contains flooring in basic specification spread, and the demand of a flooring product was greatly expanded also under the economic crisis.

INTRODUCTION

In Korea, plywood industry was specified to be export specialization industry as part of an economic development plan from the 1960s. Timber supply & demand and wood industry have been greatly expanded focusing on plywood processing deal trade. Since strengthening of the material timber export regulation in the wood resources possession country began from the 1980s, wood industry went to a decline by the big environmental change involving a raw material supply problem.

However, due to expansion of the domestic industries and the infrastructure institution from 1980s, and the increase in housing construction, wood industry was changed export led type by the 1970s to the domestic demand led type consisting mainly of engineering works and housing construction. By the way, since the domestic construction activities the domestic economic crises generated late in 1997 that are the main demand of timber stagnated and the import price rose by the fall of an exchange rate, wood industry would be pressed for reorganization.

On the other hand, previous studies had the wood industry centering on plywood.

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Kim (1994) and Jung (1993) are analysis of a structural change of plywood industry, and Kim (1991), Kim (1997) and Choi (2001) are analyzed of the supply problem of raw material. However, Joo (1998) showed that change of an exchange rate had big influence on a price and the volume of imported timber, as a result of predicting the supply and demand of timber, lumber and plywood using the analysis model of a forest products market.

In this study, the domestic economy change after an economic crisis analyzes what timber supply and demand, and wood industry were affected paying attention to change of the exchange rate which are the main causes of an economic crisis and housing construction section, being based on such precedence studies.

RESULTS AND DISCUSSION

1. Economic Crisis and the Trend of Housing Construction

1) Korean Economy under the Economic Crisis

The Korean economy has accomplished economic growth in the highest growth rate with the economical development 5 years plan that started in 1962.

However, a rapid secession of foreign capital was caused from the second half of 1990 because of, such as current balance a deficit, continuous bankruptcy of the business enterprise in and outside the country, and accumulation of the huge bad loans of a financial institution. For this reason, a won loses the reliability of domestic and international investment, and came to request support of a fund in liquidity from International Monetary Fund (IMF) late in 1997. The IMF management organization and the so-called economic crisis started (Hwang and Lee, 1999).

The fall of the won which caused the economic crisis caused the rise of an import price, the consumer prices increasing rate rose from 4.5% in 1997 to 7.5% in 1998. And the GDP growth rate which was maintaining the level of 8% from the 1990s fell to -5.8% in 1998. Moreover, the per capita GNP was also reduced to the 6,700 dollars that was the level of 1990 (Table 1).

Table 1. Trends of economic indicators in Korea

Category	Year				
	1995	1996	1997	1998	1999
Real GDP growth rate (%)	8.9	6.8	5.0	-5.8	10.7
Per capital GNP (US$)	10823	11823	10307	6742	8581
Real GNP growth rate (%)	8.1	4.8	2.1	-8.8	8.9
Exchange rate (Won)	774.7	844.2	1415.2	1207.8	1145.4
Unemployment rate (%)	2.0	2.0	2.6	6.8	6.3
Amount of exports(100 million US$)	1246	1300	386	1318	1436
Amount of imports(100 million US$)	1291	1449	1418	906	1197
Current balance (100 million US$)	-85	-230	-82	400	250

Source: National Statistical Office, 2001; The Bank of Korea, 2001.

2) Trends of Housing Construction

Since the housing construction in Korea followed with economic development and industrialization and urbanization advanced it quickly from the 1980s, and the housing

shortage difficult problem produced it in the larger cities. In order to solve such the housing shortage problem, and the government advances supply expansion centering on the high apartment house, the total housing construction number of houses is 750,000 to be the greatest ever, and an apartment occupied 67% among those in 1990 (Fig. 1).

However, while domestic economy entered into rapid dullness from the second half of 1997, construction investment and consumption also hung low, and the total housing construction number of houses for 1998 years decreased to the level of the second half of the 1980s (310,000 houses) which decreased 49% of contrast for 1997 years. Moreover, about 110,000 unsold houses existed in June 1998 (Yoon *et al.*, 1998).

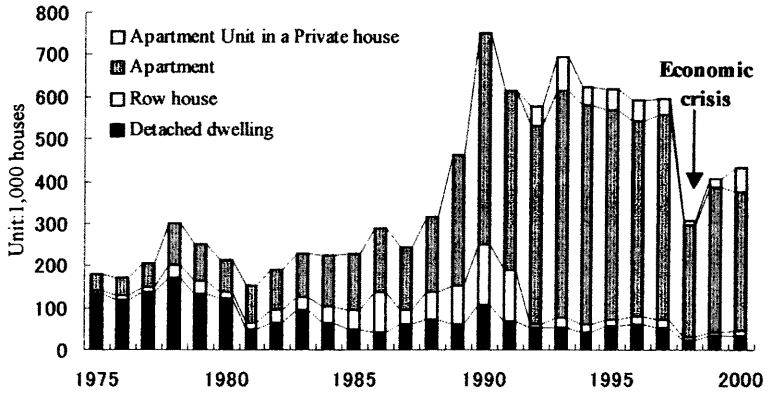

Fig. 1. Trends of housing unit construction by type (National Statistical Office, 2001)

3) Deregulation in Connection with Housing Construction

The economic crisis resulted in a big change not only to decreasing the housing construction number of houses but also to the environment involving a housing market.

First, capital liberalization was approached as conditions for the financial support from IMF, and while liberalization of real estate acquisition, the housing sale in lots, rental service, etc. which the foreigner was made to restrict until now were permitted. Hence, the foreigners' investing activities were opened widely (Hwang and Lee, 1999). Furthermore, the Korean government abolished various regulations, such as a report of land dealing, and permission, for full liberalization of a housing sale in lots price at first in order to activate the housing market that stagnated under the economic crisis (Yoon *et al.*, 1998).

As for the abolition of such various regulations, an inflow of the capital which competition between the housing industry and a foreign country that switches from house supply of government leadership to the private supply system, and it is expected.

2. Trend of Timber Supply & Demand and Wood Industry

1) Timber Supply and Demand

(1) Timber demand

The feature of the timber demand by the 1970s in Korea was the plywood processing deal trade term that the scale of wood industry expanded focusing on plywood processing deal trade, and wood import increased. That is, extensive import of the tropical wood is carried out, and plywood was processed and exported at the country. For this reason, 55% of the amount of wood demand for 1975 years (3,580,000 m^3) is an object for export, and 90% (3,230,000 m^3) was turned to the materials of the plywood for export (Table 2).

However, when it entered in the 1980, while the wood resources possession country developed the forest products industry of its own country including Indonesia which is a logs supply place, curtailment of the amount of felling and the log export embargo measure were started for environmental protection. For this reason, Korean wood industry declined quickly while losing competitive power internationally, and timber supply and demand structure also changed.

After that, although the timber demand for export was decreasing every year, in contrast with this, domestic wood demand expanded by expansion of the domestic paper & pulp industry, engineering works and housing construction in the 1980s. That is, amount of domestic timber demand increased from 2,700,000 m^3 in 1975 to 9,850,000 m^3 in 1991, and recorded the highest ever. The export led timber demand structure centering on the so-called plywood processing deal trade in the 1970s changed from the 1980s to the domestic demand initiative type.

However, since domestic economy lapsed into dullness from the second half of 1997, activity of engineering works and housing construction also reduced, and the amount of wood demand in 1998 decreased to 5,800,000 m^3 (38% reduction of contrast of the previous year). Timber demand is returned to the level before an economic crisis because economy changed to the recovery tendency after 1998.

Table 2. Demand and supply of timber (Unit: 1,000 m^3)

Year	Total	Demand									Supply		
			Domestic				Export				Round log		
		Sub-total	Pit prop	Pulp wood	Ply-wood	General use	Sub-total	Ply-wood	Sawn-wood	Sub-total	Domestic	Import	Waste wood
1975	6465	2889	542	188	–	2159	3576	3226	350	6465	896	5119	450
1980	7750	5785	515	546	1603	3121	1965	1753	212	7750	1008	6141	601
1990	9423	9121	512	479	1849	6281	302	40	262	9423	1138	8285	640
1995	9284	8939	139	1275	1300	6225	345	186	159	9284	1055	8229	1526
1996	9225	8893	109	1287	1334	6163	332	159	173	9225	1195	8030	1704
1997	9328	8987	104	1253	1611	6019	341	79	262	9328	1062	8266	1723
1998	5798	5265	110	992	859	3304	533	262	271	5798	1428	4370	1185
1999	8317	7836	117	1361	1051	5307	481	233	248	8317	1694	6623	1582
2000	8327	7897	112	1295	1066	5424	430	179	251	8327	1592	6785	1816

Source: Statistical Yearbook of Forestry, 2000.

Note: Total of demand and supply of timber is exclusive of waste wood.

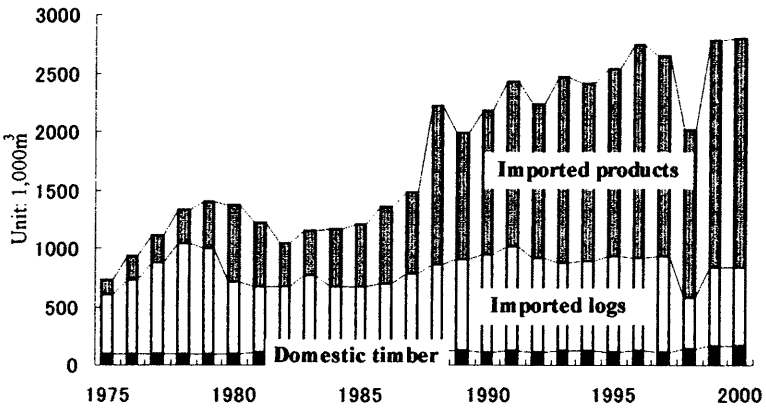

Fig. 2. Trends of timber demand and supply (Statistical Yearbook of Forestry, 2001)

(2) Timber Supply

Since economic development started in the desolate conditions of the forest resources in spite of the increase in timber demand, it did not pass over the amount of supply of domestic wood before and after 1,100,000 m^3 in general, but timber supply has almost been dependent on imported wood. The volume of imported timber increased remarkably, when 6,380,000 m^3 for 1975 entered in the 1990s, and it increased to 26,210,000 m^3 in 1996 (Fig. 2). In additionally, as the structure of imported wood, the logs import type by the 1970 is changing from the 1980 to the manufactured products type.

However, causing the rise of an import price from the second half of 1997 by the fall of a won, and making the volume of imported timber restrict. The timber amount of supply started to decrease and was 18,650,000 m^3 (27% reduction of contrast of the previous year) in 1998. The log volume of import had a remarkable reduction in it at 4,370,000 m^3 (47% reduction of contrast of the previous year).

2) Wood Industry

(1) Development Process of Wood Industry

Korean wood industry can be divided roughly in three stages until after an economic crisis from the 1960. The 1st term is an expansion term (1960~1980) wood industry grew up to be greatly by the cheap labor force with expansion of the plywood industry which processed imported log and was exported at the high economic growth term. The 2nd term is a stagnation term (1981~1997) to which wood industry retreated with the fall of competitive power by the problem of wood import structure which surround raw material supply of tropical timber from the 1980s, and which changed remarkably, and wages rise. The 3rd term is the crisis (1998~1999) of the wood industry that caused management aggravation by generating of an economic crisis under the influence by the problem of raw material supply and demand, and the rise of a production cost (Fig. 3).

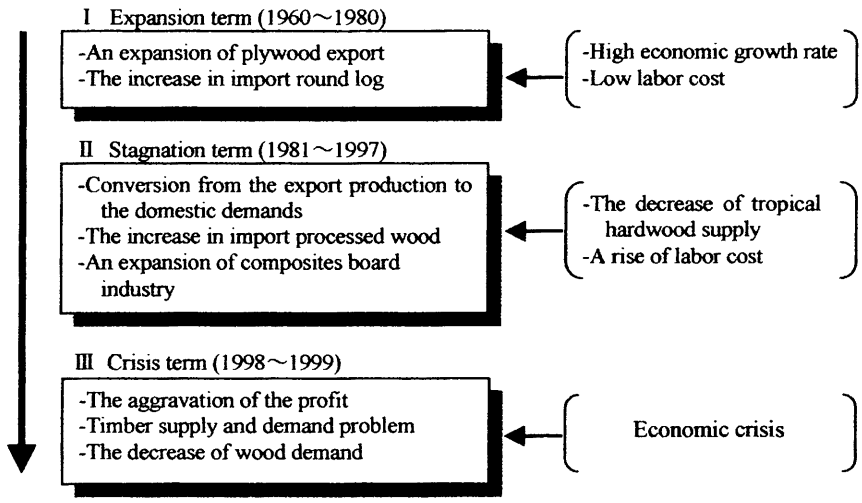

Fig. 3. Trends of the wood industry for the last four decades

(2) Plywood Industry

The plywood industry that was the pillar of the Korean wood industry was environmental change, which surrounds the supply problem of raw material from 1980s. The number of factories and the quantity of production began to decrease sharply, and 84 factories and 1,580,000 m^3 in 1980s decreased to 7 factories and 1,010,000 m^3 in 1997. Furthermore, two factories were closed down under the influence of an economic crisis in 1998, and the quantity of production decreased to 640,000 m^3 (Table 3).

Table 3. Trend of plywood industry (Unit: 1,000 m^3)

Classification	Year								
	1970	1980	1990	1995	1996	1997	1998	1999	2000
No. of factories	10	84	72	15	7	7	5	5	5
Production	1067	1575	1124	892	896	1014	641	735	747
Export	1055	953	154	101	100	54	141	135	99
Import	–	23	735	1307	1079	949	494	791	980

Source: Forestry Research Institute, Korea, 2001.

Although plywood production had been produced centering on the product with a thickness of less than 6mm till the 1970s, since change of plywood materials and plywood production of the countries in Southeast Asia got into stride from the 1980s, the domestic plywood company set about the product production which is relatively competitive. That is, since domestic plywood demand increased with active engineering works and housing construction activity from the 1980s, plywood production was converted into the production system centering on the plywood for concrete formwork with a thickness of 12 mm or

more (Jung, 1993). The plywood production ratio of 12 mm or more to the amount of gross products was expanded from 36% in 1980s to 97% in 1997 (Table 4).

Table 4. Production of plywood by thickness (Unit: 1,000 m^3)

Year	Total	<3.5 mm	3.6~5.9	6.0~11.9	>12.0 mm
1980	1575	30	823	149	573
1990	900	150	38	27	685
1995	722	13	3	2	704
1996	726	7	4	6	709
1997	866	7	8	13	838
1998	519	8	5	24	482
1999	594	7	17	28	542
2000	598	3	19	21	555

Source: Wood Panel Association, Korea, 2001.

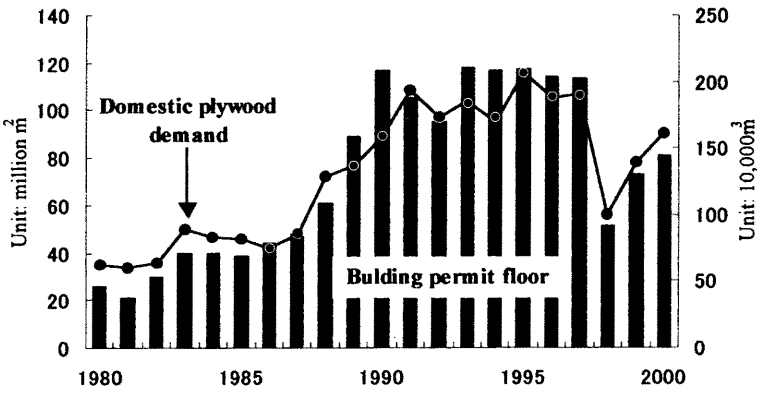

Fig. 4. Trends of domestic plywood demand and building permit floor (Statistical Yearbook of Forestry, 2001; National Statistical Office, 2001)

On the other hand, domestic plywood demand increased remarkably from 500,000 m^3 in 1975s to 1,750,000 m^3 in 1990, and the greatest ever was recorded by 2,090,000 m^3 in 1995. However, plywood demand decreased from the second half of 1997 by dullness of construction activities in 1998 to 1 million m^3 (47% reduction of contrast of the previous year) (Fig. 4). For this reason, the plywood quantity of production for 1998s was set to 520,000 m^3 that decreased 40% of contrast in the previous year.

(3) Composites Board Industry

It expanded Korean composites board industry by contrast quickly from the 1990s that plywood industry decreased with a peak of the 1980. As of 1999, PB (Particleboard) production company has four companies and five factories, and annual productive

capacity is 680,000 m^3. And MDF (Medium Density Fiberboard) production company has five companies and ten factories, and annual productive capacity amounts to 970,000 m^3.

The Korean composites board product is mainly used for manufacture of furniture and a cabinets, etc. rather than the construction use. PB increased rapidly, after entering in the 1990, and 170,000 m^3 for 1990 expanded to 720,000 m^3 in 1997. Since MDF had a special quality of materials, which is easy to process its surface, they considered as the alternative material of plywood and 110,000 m^3 for 1990 increased them to 730,000 m^3 in 1997.

On the other hand, since composites board industry uses domestic lumber and plywood waste wood as materials, the quantity of production exists in the trend of the operating ratio of lumber and plywood industry. This decreased temporarily in 1998 to PB is 510,000 m^3 (30% reduction of contrast of the previous year), and MDF is 570,000 m^3 (22% reduction of these contrast). As for the reason, it is mentioned that the waste wood amount of supply decreased and raw material reservation became difficult by decline in these operating ratios. However, PB increased to 670,000 and MDF increased to 840,000 in 1999 (Table 5).

Table 5. Production and import of composites board (Unit: 1,000 m^3)

Classification		Year						
		1986	1993	1996	1997	1998	1999	2000
No. of factories	P B	–	4	4	4	4	4	4
	MDF	–	6	5	5	5	5	5
Production	P B	105	435	659	720	507	672	722
	MDF	12	268	719	728	571	831	973
Import	P B	–	516	355	293	173	436	485
	MDF	–	144	53	58	28	172	380
Domestic supply	P B	105	414	641	748	506	658	718
	MDF	11	268	631	689	507	745	795

Source: Statistical Yearbook of Forestry; Wood Panel Association, Korea, 2000.

(4) Flooring Industry

The flooring for residences in Korea appeared for the first time late in the 1980s, and change of the housing demand by the consumer was seen from the 1990s, as use of the flooring from a housing construction company, so spread of it had been increased. Furthermore, in order to sell the unsold and new apartment between house construction companies with liberalization of a housing sale in lots price under an economic crisis, competition of product differentiation in the form included in basic specification raised the flooring. For this reason, the demand of a flooring was expanded sharply not only in the existing high–class apartment but in medium and small apartment.

Production of the flooring is from a company including existing plywood and composites board industry, and one company in 1994 increased it to 12 companies in 1998, and 20 companies in 2000 (Table 6). The quantity of production was sharply expanded from 70,000 m^2 in 1995 to 230,000 m^2 in 1998 which construction activities reduced fur-

ther in 1997. As for the volume of imported 750,000 m^2 in 1997 decreased by the rise of an import price in 1998 to 110,000 m^2 (6.8 times reduction contrast of the previous year) (Fig. 5).

On the other hand, production of the domestic flooring is divided into Parquet Flooring and Laminate Flooring. Although the quantity of production is increasing every year in Parquet Flooring, as for a market share, 100% by 1996 is falling to 86% in 1997, and 73% in 1999. Compared with this, 14% market share in 1997 for Laminate Flooring, which was extended in the big market share to 29% and 30% in 1998 and 2000, respectively (Table 6).

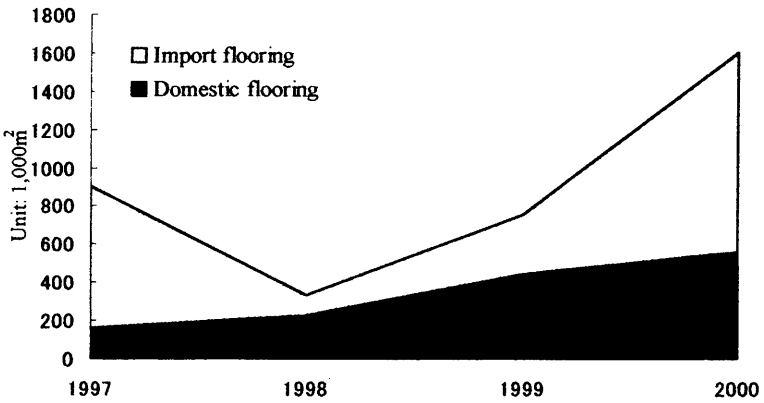

Fig. 5. Trends of flooring production and import (Forestry Research Institute, 2001)

Table 6. Share of domestic flooring (Unit: %)

Classification	Year					
	1995	1996	1997	1998	1999	2000
No. of companies	4	7	9	12	18	20
Parquet flooring (%)	100.0	100.0	83.3	70.7	73.2	69.8
Laminate flooring (%)	-	-	13.7	29.3	26.8	30.2

Source: Forest Research Institute, Korea, 2001.

CONSIDERATION

Rapid change of an exchange rate was after the second half of 1997 the main causes of having had big influence on wood supply & demand structure and wood industrial structure.

Table 7 shows how the production cost of wood industry went up by change of an exchange rate. As for the rate of a won, 805 won in 1996 fell to 1,400~1,600 won

(increase in 74%~99% of 1996 contrast) in 1998. Then, each cost also increased greatly and, for lumber industry is the 1.9 times, pulp industry (chemistry pulp) is the 1.7 times, board industry (MDF) is the 1.8 times and plywood industry is the 1.6 times (Table 7).

Moreover, Table 8 shows how the wood price rose by change of an exchange rate. The rate of a won fell from 844 won late in 1996 rapidly late in 1998 to 1,200~1,400 won (increase in 68% of 1996 contrast). Then, the logs of an import price were a maximum of 70% in 1998, and the wooden products went up to 50%. They were the main causes by which the logs volume of import in 1998 decreased to 47% of contrast in the previous year, because of the rise of such an import price (Table 8).

On the other hand, when the cause of change was seen according to wood industry, since plywood industry depended for the great portion of raw material on imported log, such as Radiate pine and Lauan, the rise of an import price brought about reduction of plywood demand, and making the expense burden of raw material increase. Although the composites board industry became difficult because of reduction of lumber & plywood waste wood amount of supply as raw materials reservation, a part for short supply was replaced with domestic logs, and the board price rose with the price boost of domestic logs. Moreover, although the product of import boards brought about the rise of an import price with imported plywood when it entered in 1998, and since the price of the product

Table 7. Change of production cost index by an exchange rate

Exchange rate (Won/U.S.dollar)	Year			
	1996	1998		
	805	1200	1400	1600
Plywood (%)	100	132	149	165
M D F (%)	100	129	144	158
Sawnwood (%)	100	144	167	189
Chemical pulp (%)	100	141	161	182

Source: Rural Economic Institute, Korea, 1998.
Note: 1) 1996=100 (production cost index)

Table 8. Change of wood products price by an exchange rate (Unit: 1,000 Won)

Exchange rate (Won/U.S.dollar)	Year				
	Dec-96	Dec-97	Mar-98	Jun-98	Sep-98
	844	1415	1379	1385	1374
Plywood 3 mm	4.9	7.5	7.8	4.5	4.6
Plywood 12 mm	16.7	22.2	22.6	18.7	17.3
P B 15 mm	8.4	11.4	12.1	10.7	9.4
M D F 3 mm	3.1	4.5	4.9	4.4	4.3
Import plywood 2.7 mm	5.3	7.4	7.4	3.9	3.5
Domesic log (Pine)	100.0	106.0	108.8	112.7	111.3
Hemlock	150.0	168.0	255.0	222.0	222.0
Lauan	390.0	480.0	540.0	375.0	375.0
Radiate pine	-	123.0	180.0	195.0	195.0

Source: Forestry Cooperatives, Korea, 1996, 1997, 1998.

from Southeast Asia fell from the 1998 middle of the year, it was the cause in which import of wooden products recorded the greatest ever in 1999.

On the other hand, the demand change between the products in flooring industry was for the supply structure of raw material. That is, when adopting the flooring in medium and small apartment while calling at the housing construction company under an economic crisis, parquet flooring brought about demand reduction with the rise of a product price for depending for 90% or more of raw material on imported plywood. Since laminate flooring used HDF (High Density Fiberboard) which is a kind of a board product in contrast with this, that there was competitive power of a price compared with other products was the cause which demand expanded in 1998.

CONCLUSIONS

Korean economy was influenced according to the economic crisis generated late in 1997, such as a rate of high prices, a rate of high exchange rate, a rate of high unemployment, and a rate of low growth. Such a remarkable economical change causes a rapid reduction of the housing construction centering on an apartment, and makes the demand of wooden products including the plywood mainly turned to concrete construction decrease.

When it entered in 1998, with the rapid fall of an exchange rate, the imported timber price rose and the timber volume of import brought about a rapid reduction. However, the wood industry that makes imported logs the main raw materials brought about retreat of wood industry, raising a domestic wooden products price to 30% or more with the rise of a production cost.

In contrast with retreat of such wood industry, in order that flooring industry might sell the apartment by the housing construction company in economic depression, the demand in the form which contains flooring in basic specification spread, and the flooring product brought about a big demand expansion under the economic crisis. Since laminate flooring, which utilization HDF (High Density Fiberboard) in it had the competitive power of a price, its expansion of demand was remarkable.

On the other hand, deregulation concerning the housing construction section and the diversification of a consumer's housing demand under an economic crisis, the increase in the new wood demand involving a housing construction section will be expected in the future as the demand of a flooring product expanded diversification of housing demand quickly.

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